

MEDICAL STUDENT RESEARCH DAY

HIGHLIGHTING THE BREADTH OF RESEARCH AND SCHOLARLY ACTIVITY

MAY 5, 2020



School of Medicine & Health Sciences

THE GEORGE WASHINGTON UNIVERSITY

This year there will be a special medical student research day to be held on May 5th, 2020 that is distinct from the university-wide research day. This 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.

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. We anticipate that abstract submissions will 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.

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Orthopedics

Kinematically Aligned Total Knee Arthroplasty has a Lower Incidence of Arthrofibrosis and Arthroscopic Lysis of Adhesions Compared to Mechanically Aligned Total Knee Arthroplasty

INTRODUCTION: Traditionally, total knee arthroplasty (TKA) involved placement of implants to achieve neutral mechanical alignment of the limb. While mechanical alignment has been both reliable and reproducible, it assumes all patients' knees optimally function along the mechanical axis of the limb irrespective of the knees' alignment in the pre-arthritic state. Moreover, soft tissue releases are frequently necessary with this technique and may increase risk for arthrofibrosis after TKA. When stiffness is persistent in the acute postoperative period, arthroscopic lysis of adhesions (ALOA) may be required to increase range of motion and reduce pain. Kinematic alignment has emerged as an alternative methodology for TKA alignment. This method bases bony cuts off of the patient's pre-arthritic anatomic axis in order to limit soft tissue and ligamentous releases. A single surgeon at our institution transitioned from mechanical to kinematic alignment for TKA midway through a 5-year study period. This study aimed to determine if performing less soft tissue releases via kinematic alignment reduced the incidence of severe postoperative arthrofibrosis requiring ALOA. Methods: Patients receiving TKA by a single surgeon from a single institution between 2012 and 2019 were retrospectively collected. Midway through this 8-year period, the surgeon institution between 2012 and 2019 were retrospectively collected. Midway through this 8-year period, the surgeon transitioned from mechanical to kinematic TKA techniques. At our institution, patients are indicated for ALOA if they have functional pain <90 of terminal flexion at 6 weeks postoperatively. Two cohorts were created based on surgical technique: a mechanical alignment cohort and a kinematic alignment cohort. Incidence of return to the operating room for ALOA was recorded for each cohort and their values were compared. Statistical analysis was performed with Pearson's chi-squared test. Results: 188 patients undergoing primary TKA qualified for with 67 patients in the kinematic cohort and 121 patients in the mechanical cohort. There was no difference in baseline characteristics between these two patient populations. The incidence of acute ALOA for the mechanical group was 13.2% versus 2.9% for the kinematic group. This difference was statistically significant (p=0.021). Conclusion: Kinematically aligned TKA aims to restore the pre-arthritic joint alignment of the knee while limiting soft tissue and ligamentous releases. This analysis indicates that without any change in ALOA indications or postoperative rehabilitation protocols, kinematically-aligned TKA has a lower incidence of postoperative stiffness requiring ALOA when compared to mechanically-aligned TKA. Summary Kinematic alignment for TKA is associated with a significantly lower incidence of severe arthrofibrosis requiring arthroscopic lysis of adhesion compared to mechanical alignment.

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Opthalmology

Macular Degeneration in an Ethiopian Population: A Case Series Comparing Fundus Photos, Fluorescein Angiography, and Optical Coherence Tomography

INTRODUCTION: Age-related macular degeneration (AMD) is the leading cause of vision loss in those 65 years of age or older (Bourla, 2006). Many studies on AMD have historically used Caucasian populations, although different studies have found that AMD has different characteristics amongst different populations (Klein, 1992; Vingerling, 1996; Joachim, 2015; Varma, 2004; Kawasaki, 2009). Ethiopia has one of the highest rates of blindness in the world (Cherinet, 2018). Our GW-MFA department of ophthalmology has anecdotally noted that Ethiopian patients, primary Amharic-speaking individuals, would inexplicably present with more advanced AMD out of proportion to their age and risk factors. This motivated us to investigate AMD in our Ethiopian population using a retrospective chart review. Methods: Patients at our ophthalmology department were analyzed from July 2008 to July 2018. Subjects were included if they had an ICD-10 diagnosis of Age-Related Macular Degeneration and either had Amharic recorded as their primary language or self-identified as ethnically Ethiopian. No exclusion criteria were applied. Analysis was then performed on the patients? clinical notes, Fundus Photos, Fluorescein Angiography, and Optical Coherence Tomography imaging. Results: 21 Ethiopian Individuals (42 eyes) enrolled in this study. Ten patients were males (47.6%), and the average age at diagnosis was 58.2 years old. All patients were treatment naïve prior to presentation. We found that 15 eyes (36.4%) presented with neovascular exudative degeneration while 27 eyes (63.6%) had nonexudative degeneration. Moreover, 10 eyes (23.8%) showed geographic atrophy. This population demonstrated a higher relative percentage of exudative to nonexudative lesions (36.4%) than the prevailing figures for Caucasians (15%). Additionally, this population had a lower average age of presentation (58.2) compared to their Caucasian counterparts. Conclusions: For the first time, we characterized AMD in an Ethiopian population. Compared to their Caucasians counterparts, Ethiopians present with AMD at a lower age with more extensive disease process and a trend towards exudative degeneration that carries worse prognosis. Future avenues of research could identify genetic risk factors or possible targets for gene therapy in a broader, global population.

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Genomics

Perfecting Genomic Diagnostic Assays by Identifying and Eliminating Serum RNAse Hetereogeneity

With a nearly complete copy of the human genome and an advance in molecular biological techniques, RNA expression levels become a powerful tool for clinical diagnostics, yet RNA stability is often compromised by RNAses. Because purified RNAses can renature after essentially complete denaturation and because some patients consistently yield poor RNA integrity ("degrader" patients) we hypothesized that serum RNAses are discrepant among the population and that certain blood RNAses renature after RNA isolation. This research aims to quantify and characterize these heterogeneities. We identified "degrader" patients through whole blood Tempus isolation and Agilent Chip RNA integrity (RIN) score. The resulting low RIN scores were compared to consistent "non-degraders" for RNA integrity and quality metrics. "Degrader" and "Non-Degrader" whole blood was then processed with de-naturant conditions (+/- 2 Mercaptoethanol) and re-naturant conditions (+/- di-valent cations and heat incubation) and "non-degrader" samples were further reconstituted with RNAses from blood. These "non-degrader" samples were assessed for RNAse concentration using fluorophore attachment and quantification through the Quibit Fluorometer. Samples positive for RNAses [(+) control and all three blood +2ME single dilutions] yielded an average Quibit score of 3.135, 4.155, 2.855, 3.39 respectively, compared to an average (-) control of 0.486. A second dilution yielded no RNAse activity with an average quibit score of 0.8546. All samples that underwent tempus isolation, regardless of DNAse or 2ME conditions or timepoint yielded no RNAse activity with an average Quibit score of 0.66 and an average of 0.431 without time-dependent outliers. Even with RNAses present, Agilent protocol on "non-degrader" samples confirms that little to no degradation activity was detected for samples with and without reconstitution, denaturant or renaturant conditions, yielding an average RIN score of 8.016 whereas degrader samples had an average RIN score of 6.5625 and all identical conditions. RNA integrity in the "non-degrader" population correlated more highly with RNA concentration (Pearson coefficient of 0.878 and p-value of 0.000173) than with RNAse concentration (Pearson coefficient of 0.396 and p-value of 0.210103). We conclude that under numerous and extensive re-naturant and de-naturant conditions, "non-degrader" patients did not convert to a degrader. Similarly, "degrader" patient did not convert. Given this data, we are left to believe that there is a characteristic difference between the RNAses in the two patients' serum RNAses with the recognition that a follow-up confirmation assay yielding full denaturation for "degrader" samples with proteinase K is essential.

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CLINICAL AND TRANSLATIONAL RESEARCH

Dermatology

Racial Disparities in the Utilization of Dermatologists for Primary Cicatricial Alopecias

BACKGROUND: Early detection and treatment of cicatricial alopecias is critical to prevent permanent hair loss. Objective: To assess if there are racial disparities in the utilization of dermatologists for scarring alopecias. Methods: We performed a retrospective chart review of treatment naïve individuals seeking evaluation for primary cicatricial alopecias. Results: We identified 86 treatment naïve individuals (98% women) with clinically diagnosed primary cicatricial alopecias. In this cohort, subjects who were black presented to dermatology on average 45.6 months after the self-reported onset of hair loss compared to 16.8 months after the self-reported onset of hair loss in subjects who were white (P=0.002). Additionally, black subjects presented to dermatology with more severe alopecia, having lost an average of 37.7% of their scalp hair compared to 20.3% lost at presentation in white subjects (P<.001). In regards to retention in care, black subjects also followed up for shorter periods of time (mean 8.2 months) compared to white subjects (mean 15.7 months, P=0.016). Conclusion: There are significant racial disparities in the utilization of dermatologists for primary cicatricial alopecias.

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CLINICAL AND TRANSLATIONAL RESEARCH

Opthalmology

Adaptive Optics Study of the Porcine Retina And Potential use in Assessing Cone Density after Induced Pluripotent Stem Cell (IPSC)-Derived Retinal Pigmented Epithelia (RPE) and Photoreceptor (PR) Transplantation

Adaptive optics (AO) imaging in visual science has recently gained momentum as a valuable technique for assessing retinal disease at a cellular level. Current techniques including multifocal electroretinography (mfERG) and optical coherence tomography (OCT) assess the functional potential of photoreceptors and gross retinal pathology in cross-section, respectively, but lack the capacity for more detailed visualization and quantification of individual cones. The ability to conduct multiple evaluations of a region of interest (ROI) on histologic scale offers a unique perspective on cellular dynamics of the retina in vivo. In this project, AO was applied to the quantification of photoreceptors in the porcine retina following implantation of a novel iPSC-based retinal patch in regions of laser-induced damage that model patterns observed in age-related macular degeneration (AMD). We tested the hypothesis that AO would serve as a useful tool for quantifying photoreceptor density over time in porcine eyes. AO was performed on porcine eyes (n=14). The rtx-1 machine was used to image eyes at baseline and at monthly timepoints thereafter. To model AMD, laser power of 1% duty cycle was used to damage the RPE layer, which was followed by 2x4 mm iPSC-RPE/PR subretinal patch treatment. For image analysis, OCT fundus images were superimposed with AO montages to evaluate retinal integrity in untreated, laser and transplanted retinal ROIs. Cone photoreceptors were then counted in a semi-automated manner using AO detect software at each timepoint. Parameters of density and regularity for three 80x80 px squares were averaged for each ROI. At baseline, cone photoreceptors appeared primarily in the central streak at an average density of 19,420±2,038 cones/mm2. Moving towards the periphery, density decreased to 16,797±4458 cones/mm2 adjacent to the streak and 16,558±1,897 cones/mm2 outside of the streak. Following laser treatment, density decreased to 8642±6488 cones/mm2, after which the pigs underwent surgical implantation of the patch. At the 60-day timepoint in the postoperative period, ROIs within the implant demonstrated higher densities of photoreceptors (15,133±182 cones/mm2) compared to untreated laser ROIs (13,954±2,784 cones/mm2). The pig is an important large animal model in preclinical studies of retinal therapeutics, which comprise a new generation of potential treatments for AMD. The findings in this model suggest that with implementation of a novel iPSC-based patch, AO technology may help quantify change in photoreceptor density more precisely than any other imaging modality currently in use.

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Infectious Disease

Evaluation of Barriers to Antiretroviral Therapy among People with HIV in Washington, D.C.

BACKGROUND: Washington, D.C. has one of the nation's highest rates of HIV, at ~1.8% of the general population, with historically disadvantaged communities disproportionately affected. Successful management of HIV necessitates patient engagement in multiple steps along a care continuum beginning with testing and diagnosis, followed by linkage to care, retention in care, and adherence to antiretroviral therapy (ART). We conducted a prospective cross-sectional study exploring individual-level and structural barriers to ART initiation and continuation. Methods: Fifty patients (of target N=200) with diagnosed HIV but not currently taking ART were enrolled and completed structured surveys. De-identified data was entered into REDCap. Interim statistical analysis was conducted using two-tailed t-tests and Chi-Square tests. Results: Twenty-two patients were enrolled at the hospital and 28 at the Infectious Diseases clinic. Median patient age was 43.9 years (range 26-66); 56% were male, 92% were African-American, and 55% were heterosexual. In reporting how they believe they acquired HIV, 36% reported sex with opposite-gender partner, 34% reported sex with same-gender partner, 9% reported drug use, and 20% stated "other". Participants reported a history of homelessness, arrest/incarceration, or mental health diagnosis, at 46%, 56%, and 54%, respectively. The majority (92%) had been referred for HIV care, 90% had seen a doctor, and 86% started taking HIV medications but later discontinued. Major reasons for discontinuing ART reported as "agree" or "strongly agree" included high pill burden (53%), fear of stigma (48%), side effects (44%), mental health (40%), feeling healthy (38%), and alcohol/drugs (36%). Lack of insurance, being unable to afford medications, or not understanding how to take medications played smaller roles. Although preliminary analysis did not result in any statistically significant associations, differences between interview sites were suggested, with hospitalized patients (i.e. those with more severe disease or suffering HIV-related complications) more likely to report use of alcohol/drugs, and clinic patients more likely to report mental health problems and side effects from medications. Many participants indicated additional barriers to care besides those included in the survey. Conclusion: Engagement in HIV care of patients should consider individual as well as systemic obstacles and may require different approaches if occurring in the hospital versus clinic. While some common barriers were identified, each patient's experience with ART is different. It is important to explore individual barriers for individual patients. This study should be continued to achieve target enrollment to further explore barriers to continuous ART among people with HIV in Washington D.C.

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Surgery

Robotic Assisted Surgery For Rectal Adenocarcinoma Shows Promising Outcomes Compared To Laparoscopy And Laparotomy: A National Cancer Database Propensity Score Matched Analysis

BACKGROUND: The purpose of this study is to examine the oncologic and survival outcomes for the management of rectal adenocarcinoma by robotic, laparoscopic, and open approaches within a large population database. Methods:The National Cancer Database (NCDB) from 2010 to 2016 was reviewed for all cases of invasive adenocarcinoma of the rectum or rectosigmoid junction (SEER Histology Codes 8140) who underwent surgical resection. Groupswere separated by approach (open, laparoscopic, or robotic). One to one nearest neighbor propensity score matching(PSM) ± 1% caliper was performed across surgical approach cohorts to balance potential confounding covariates. Kaplan-Meier estimation and Cox-Proportional Hazards regression were used to analyze primary outcome ofsurvival. Secondary outcomes were analyzed by logistic regression. Results: Inclusion criteria and PSM identified8526 cases per treatment approach (n=25578). PSM provided adequate discrimination between treatment cohorts(0.6<AUC<0.7) and potential confounding covariates did not significantly differ between cohorts (all respectiveP>0.05). Cox-Proportional Hazards regression indicated decreased mortality hazards associated with robotic relativeto open (P<0.01), laparoscopic relative to open (P<0.01), and no difference between robotic and laparoscopic(P=0.70). Five year Overall Survival rates were higher in robotic and laparoscopic (71.3%, 72.4%) versus open (P=0.70). Five year Overall Survival rates were higher in robotic and laparoscopic (71.3%, 72.4%) versus open(67%). Conversion to open was significantly more common in laparoscopic cases relative to robotic cases (15.5% vs7.1%; P<0.01). Relative to open and laparoscopic approaches, robotic approach was significantly associated withincreased odds of having 12 or more regional nodes examined. Relative to open, a minimally invasive approach wassignificantly associated with increased odds of 12 or more regional nodes examined, decreased odds of positive margins, increased odds of negative circumferential resection margin, and decreased odds of 30-day and 90-daymortality (all respective P<0.05). Combined MIS approaches were associated with shorter time from surgery tochemo relative to open approach (P=0.05). Additionally, no statistically significant difference was detected betweenrobotic and laparoscopic approaches for regional nodes positive, positive margin status, negative circumferentialresection margin, unplanned readmission, or 30-day mortality. Conclusion: In the management of rectal cancer, this propensity score matched analysis demonstrated that the robotic approach confers a lower conversion to open ratethan the laparoscopic approach and that a minimally invasive approach is associated with increased 5 year OverallSurvival rates. Relative to open and laparoscopic approaches, robotic approach was significantly associated withincreased odds of completed lymphadenectomy. Additionally, in those who received adjuvant chemotherapy, aminimally invasive approach was associated with a shorter to receipt of chemotherapy.

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Cardiology

Comparison of Average and Lowest Home and Office Blood Pressure Recordings and Implications on the Management of Chronic Hypertension

Hypertension is a major modifiable risk factor for cardiovascular disease and premature mortality in the US. Studies suggest that elevated home blood pressures (BPs) are associated with cardiovascular events, stroke, and mortality. The Systolic BP Intervention Trial (SPRINT) demonstrated that lower target BP, less than 120/80, resulted in lower rates of fatal and nonfatal cardiovascular events and death. Subsequently, the American Heart Association & American College of Cardiology (AHA/ACC) altered their guidelines to adopt this as the new target. However, SPRINT specified 5 minutes of quiet rest followed by 3 measurements without an observer present; a method is not routinely used in practice. Another study found that BP measurements taken using the SPRINT method were significantly lower than routine BPs and that end organ damage had a stronger relationship with the SPRINT method. The ACC/AHA guidelines instruct providers to take the average of at least two BP recordings. This is based on expert opinion and there is no literature to support this. We sought to understand if the average BP recording is significantly different from the lowest BP recording in the home and office settings. We enrolled 18 patients with hypertension to collect 3 home BP recordings in the morning and 3 home BP recordings in the evening for 7 days. hypertension to collect 3 home BP recordings in the morning and 3 home BP recordings in the evening for 7 days. We also collected 2 office BPs. We utilized the 2-tailed paired t-tests to determine the differences between BP recordings. Mean home systolic blood pressure (SBP) was 131.9 mm Hq, mean office SBP was 136.8 mm Hq, this difference was not significant (p=.29). The difference between mean diastolic blood pressure (DBP) in both settings, 1.1 mmHg, was also not significant. However, the minimum office SBP and minimum office DBP were significantly higher than the minimum home recordings, 19 mmHg SBP (p=.003) and 9 mmHg DBP (p=.015) higher. In both settings there was a significant difference between mean and minimum readings: mean home BP was 21/13 mmHg (p<.0001) higher than the minimum home BP and the mean office BP was 7/2 mmHg (p=.01 SBP, p=.011, DBP) higher than the minimum office BP. We found that minimum BP is significantly lower than mean BP in both settings. This may indicate that the minimum BP is likely the true BP, which could correlate with cardiovascular outcomes more closely than the average BP. Therefore, we may be over-treating patients by using the SPRINT target BP, but not adopting their measurement technique in the clinic.

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Cancer

Salvage Surgery for Locoregional Failure After Chemoradiation in Rectal Squamous Cell Carcinoma: A National Cancer Database Analysis

BACKGROUND: Primary squamous cell carcinoma (SCC) of the rectum is a rare diagnosis, representing 0.1-0.25 per 1000 cases of colorectal cancer. Given the low incidence of this disease and lack of a standardized treatment protocol, significant variation in treatment exists in the literature for rectal SCC. Currently, surgery is cited as being used as a salvage technique after failed chemoradiation. This analysis sought to examine the short and long term oncologic outcomes in those who receive neoadjuvant chemoradiation and salvage surgical resection for rectal SCC. Methods: The National Cancer Database (NCDB) was reviewed for cases of squamous cell cancer of the rectum from 2004-2016. Patients were excluded if they did not receive neoadjuvant chemoradiation or undergo definitive surgical resection. Descriptive statistics were examined for oncologic outcomes in those who required resection after neoadjuvant therapy. Results: From 2004-2016, a total of 184 patients were diagnosed with primary rectal SCC and underwent neoadjuvant chemotherapy followed by surgical resection. The average age of these patients was 56.3 ± 11.6 years. Patients who underwent salvage resection were more commonly female, white, privately insured, and treated at an academic center. The most commonly performed procedure was low anterior resection (56.0%) followed by abdominoperineal resection (33.7%). Nineteen patients (10.3%) required pelvic exenteration. Median survival was 8.5 years. Five year overall survival was 60.6% (95% CI: 52.7-68.5%). Conclusion: Squamous cell carcinoma of the rectum is a rare malignancy. In those diagnosed, up front chemoradiation may offer definitive treatment, with surgery used in circumstances of progression or recurrence. To date, this is the largest study to examine the long term survival in this subset of patients.

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Surgery

A Contemporary Analysis: Presenting Symptoms and Timing of Surgical Intervention in Patients with a Vascular Ring

Vascular rings cause respiratory or gastrointestinal (GI) symptoms due to compression of the trachea or esophagus. Improved imaging resulting in early detection poses new challenges for management of patients with a vascular ring. A single-center, retrospective study was done for all patients diagnosed with vascular rings between 2000-2019. Patients with congenital heart disease requiring intervention were excluded. Demographics, symptoms, diagnostic testing and interventions were recorded. Respiratory and GI symptoms were stratified by severity. Of 100 patients, 13 rings were detected in utero, 5 were found incidentally and 82 were identified after evaluation for symptoms. 34 patients had double aortic arch (DAA) and 66 right aortic arch/aberrant subclavian artery (RAA-AbSA). Median age at diagnosis was 0.4 years (IQR: 0.2-2.0) for patients with DAA and 0.7 years (IQR: 0.1-3.8) for those with RAA-AbSA. Surgery was performed in 94% of patients with DAA at a median age of 0.5 years (IQR: 0.3-3.1); 91% were symptomatic, all with respiratory symptoms. Surgery was performed in 63% of those with RAA-Ab-SA at a median age of 1.6 years (IQR: 0.4-4.5); 86% were symptomatic, all with respiratory symptoms. 85% of patients with DAA were symptomatic at the time of diagnosis; all had surgery. 67% of patients with RAA-AbSA were symptomatic at the time of diagnosis; though only 80% had surgery. In all RAA-AbSA patients who were symptomatic and did not receive surgery (n=9), respiratory or GI symptoms were noted to be mild. Chi-square analysis found moderate/severe respiratory symptoms predictive of surgery in patients with a RAA-AbSA (OR 6.0, p = 0.002). Surgical survival was 100%. Vascular rings are most often identified after clinical investigation of symptoms; which are more often respiratory. Although RAA-Ab-SA is more common than DAA, the latter is more likely to present with symptoms severe enough to warrant surgery. Asymptomatic patients should be followed to assess for worsening symptoms. Since repair can be undertaken with minimal risk, surgery should be considered in patients with more than mild symptoms.

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Neurosurgery

CyberKnife Radiosurgery Treatment of Trigeminal Neuralgia: A Single Institution Examination With Long Term Follow-Up

BACKGROUND: During the past decades, frame-based stereotactic radiosurgery, and Gamma Knife® in particular, has proved its efficacy and safety as therapy for Trigeminal Neuralgia (TN). However, few studies exist using non-frame-based radiosurgery devices such as CyberKnife (CK), especially studies that report longterm follow-up. Objective: The primary objective is to evaluate the long-term effectiveness of CK stereotactic radiosurgery on TN pain response. As has previously been described with Gamma Knife®, it is hypothesized that the retention of pain relief is inversely correlated with follow-up duration. Methods/Design: From 2010 to 2019, 38 patients were treated for symptomatic trigeminal neuralgia at our institution: 68.4% patients were female, mean age was 72.3 yo (range: 30-93). A retrospective chart-review of these patients was performed in order to collate predefined variables, which was followed by a prospectively collected follow-up phone survey to collect most recent health data. CK outcome was measured using the Barrow Neurological Institute (BNI) scores for pain and hypoesthesia, which was statistically evaluated by univariate and multivariate analyses. We considered a successful CK treatment as a follow-up BNI pain score that decreased from respective pre-treatment BNI pain score. Results: CK treatment was initially successful in 87.5% of patients, with time to max pain relief ranging from 3 weeks to 36 weeks (mean 10.5 weeks). Continued success at most recent follow-up was reported in 81.3% of patients (mean follow-up 37.1 months, 18 patients lost to f/u). The median pre-treatment BNI pain score was V and the median BNI pain score at most recent follow-up was Illa, indicating an improved quality of life. Trigeminal pain recurred in 18.8% of patients (range: 1.3 to 2.0 years). New-onset bothersome trigeminal hypoesthesia (defined as BNI hypoesthesia=II/III) was reported in 68.6% of patients. Increased CK success was found to correlate with increased BNI hypoesthesia scores (p=.001) as well as with increased side effects such as dysphagia and paresthesia. (p=.003). Additionally, increased CK success was found to correlate with an idiopathic pathogenesis of TN pain in comparison to TN pain derived from stroke/tumor/surgery (p=.034). Interestingly, CK success did not correlate with typical nor atypical TN classification. Conclusion: CK stereotactic radiosurgery is an effective long-term therapy for treating TN, however, patients should be aware that such symptoms as hypoesthesia, paresthesia, and dysphagia can occur that correlate with an effective treatment. Furthermore, TN pathogeneses should be taken into account to be used as a possible predictor of success during CK treatment planning.

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Otolaryngology

Is a Multidisciplinary Aerodigestive Clinic Effective at Treating Pediatric Dysphagia?

OBJECTIVE: To determine the efficacy of a multidisciplinary aerodigestive clinic (ADC) for the evaluation and treatment of pediatric dysphagia. Methods: Single tertiary care institution retrospective chart review of all patients presenting to the ADC clinic with dysphagia between 2014 and 2019. Results: 69 patients met inclusion criteria. Mean age 3.8 years. Feeding evaluations prior to ADC visit included modified barium swallow study (17), clinical feeding evaluation (4), and fiberoptic endoscopic exam of swallowing (4). Flexible fiberoptic laryngoscopy was performed on 29 patients. Work up included direct laryngoscopy and bronchoscopy (17), flexible bronchoscopy (19), pepsin assay (2), esophagoduodenoscopy (23), and impedence probe testing (5). Five patients reported marked improvement to resolution of symptoms. Three patients reported minimal to no improvement. Conclusions: Pediatric dysphagia is a complex condition and may benefit from a multidisciplinary team approach in an aerodigestive clinic.

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Cancer

Focal Nodular Hyperplasia in Survivors of Childhood Cancer

BACKGROUND: Focal nodular hyperplasia (FNH) is a rare liver lesion, accounting for 2% of pediatric liver tumors. Clinically relevant cases of FNH in the US have a reported prevalence of 0.03%. Prior studies have suggested an increased prevalence of FNH in survivors of childhood cancer, but analyses are generally limited by small numbers of patients and short follow-up. OBJECTIVE The objective of this study is to describe the demographic and diagnostic variables among a large number of cases of FNH identified in a cohort of childhood cancer survivors treated at a tertiary cancer center. DESIGN & METHOD We performed a retrospective review of childhood cancer survivors at Memorial Sloan Kettering Cancer Center (MSK) with documented FNH on routine surveillance magnetic resonance imaging (MRI). Eligible survivors were: (1) aged <21 years at the time of primary childhood cancer diagnosis; (2) diagnosed with childhood cancer between 1990-2017; (3) survived >12 months from completion of therapy; and (4) seen in the MSK Long Term Follow Up Program at least once. RESULTS We identified FNH in 112 childhood cancer survivors (51.8% male, median age at primary diagnosis: 4.9 years [range: 0.1-21.1]; median follow-up from cancer diagnosis: 11.1 years [range, 4.0-27.8]). The most common primary cancer diagnoses were: neuroblastoma (n=55), sarcoma (n=24), leukemia (n=14), and lymphoma (n=7); 76.2% (n=16) of the leukemia/ lymphoma patients had undergone allogenic bone marrow transplant. Radiographic detection of FNH occurred at a median of 6.7 years (range: 0.8, 22.8) after the primary cancer diagnosis. Twenty-two patients (19.6%) had at least one hepatic comorbidity, including hemosiderosis/hemochromatosis (n=11), hepatic steatosis (n=5), transaminitis (n=2), hepatic fungal infection (n=1), perihepatic abscess (n=1), hepatic hamartoma (n=1), and hepatitis C(n=1). Twenty-nine females (53.7%) were on estrogen therapy. After initial identification of FNH, patients received up to 12 follow-up surveillance MRIs (median: 2) at a median interval of 6 months (range, 1-113). Twelve biopsies of suspicious lesions were performed in 10 patients; all showed benign findings. No patient went on to develop a malignancy of the liver. CONCLUSION This report suggests that FNH may be more common in childhood cancer survivors than in the general population. Based on our institutional experience, the lesions appear to be benign and do not progress to malignancy. Further investigation is needed to identify treatment-related risk factors and optimal frequency of surveillance imaging.

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Infectious Disease

Association of Vaginal Microbiota with HPV and Cervical Dysplasia: A Pilot Study

Vaginal microbiota have been shown to influence vaginal health and the acquisition of sexually transmitted infections (STIs), and more recently have been linked to human papilloma virus (HPV) acquisition, clearance, and progression to cervical cancer. Prior research has shown vaginal microbiota to cluster into 5 community state types (CSTs), four of which are dominated by Lactobacillus species and one of which consists of non-Lactobacillus species. We sought to evaluate the relationship between vaginal microbiome composition and persistent HPV infection and cervical dysplasia. Surveys and self-collected vaginal swabs were obtained cross-sectionally from 89 women aged 21 to 45 in Baltimore, Maryland between June 2016 and February 2018. 80 eligible participants were analyzed as either HPV negative (n=35), HPV positive with no evidence of dysplasia (n=21), or cervical dysplasia (n=24) cases. Vaginal microbiota were analyzed using 16s RNA sequencing. The association between CST and HPV infection with or without dysplasia was evaluated by univariate multinomial logistic regression. CST I, dominated by Lactobacillus species, was significantly associated with reduced risk of HPV carriage (OR=.16 p=.068) and dysplasia (OR=.125 p=.031) as compared to our reference group of CST IV-B, dominated by non-Lactobacillus species such as Gardnerella and Atopobium. CST IV-A also showed a reduced odds of HPV carriage (OR=.19 p=.088) and dysplasia (OR=.08 p=.016). Analysis of relative abundance data showed an increased risk among women with the top quartile abundance of Gardnerella vaginalis for HPV carriage (OR=5.3 p=.03) as well as for cervical dysplasia (OR=7.6 p=.006) as compared to the lower three quartiles. Mobiluncus was the only species analyzed alone that showed a statistically significant protective effect (OR=.23 p=.07) among the women with top quartile relative abundance in regards to developing dysplasia. When grouped together, Lactobacillus species crispatus, gasseri and jensenii showed a reduced odds of dysplasia among women with the top quartile relative abundance (OR=.3 p=.069), but relative abundance of these species alone did not have a significant effect on HPV or dysplasia.

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Cancer

Clinically Relevant Genomic Alterations Identified by Targeted Exome Sequencing in U.S. Veterans With Prostate Cancer

Prostate cancer continues to be the most common non-cutaneous solid tumor diagnosed in men in the United States, with 13,000 new diagnoses in American male veterans annually, and is the second leading cause of death in American male veterans. In an attempt to tailor treatments to each patient, specific mutations are evaluated in tumors via next generation sequencing (NGS). Although studies using NGS in clinically aggressive prostate cancers have been done in the civilian population, similar studies in veterans have not been performed to date. The study aimed to characterize the genetic profiles of prostate cancer among a veteran population treated at the U.S. Department of Veterans Affairs Greater Los Angeles Healthcare System. In this retrospective cohort study, archival or fresh prostate cancer tissue from 81 veterans (76 primary tumors, 5 metastases) underwent targeted sequencing via the Personalis ACE CancerPlus® NGS platform. The sequencing panel covers 181 genes frequently mutated in cancers. Clinically relevant genomic alterations were defined as changes in copy number or mutations (fusions, deletions, rearrangements, truncations) within established oncogene/ tumor suppressor pathways such as DNA damage repair (DDR), PI3K/AKT, p53, MAPK, WNT and AR regulation. Patient demographic statistics and frequencies of mutations from the patient samples were tabulated. Forty three percent of Veterans had primary tumors with clinically relevant genomic alterations, including 6.2% with activating mutations in MAPK pathway members (KRAS, ERBB2, or BRAF), 3.7% with somatic mutations in DDR genes (BRCA2 or ATR), 7.3% with mutations in TP53 or RB1, 4.9% in APC, 1.2% in the WNT pathway (CTNNB1), 3.7% with mutations in the PI3K/AKT pathway (PIK3R1 or AKT1), 3.7% with PTEN deletions, and 22.2% had alterations involving an AR regulated gene (SLC45A3 or TMPRSS). Of the five metastatic tumors sequenced, one had a mutation in TP53 and another had an ETS gene fusion. In this study, we demonstrate that NGS of prostate cancers in the veteran population is feasible and may help facilitate their enrollment in future precision oncology trials. Interestingly, only 43% of this cohort's tumors had detectable mutations, which is markedly different from published data on prostate cancer where virtually 100% of patients have a detectable genetic lesion. These data suggest that clinically relevant genomic alterations within the primary tumors may differ between Veterans and the general population, or genetic lesions may be present, but not recognized by the Personalis platform. Thus, larger data sets with more robust sequencing platforms are required for clarification.

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Neurology

The Use of Driving Simulators to Assess Fitness-to-Drive Following an mTBI

BACKGROUND: Recovery from mild traumatic brain injury (mTBI) can be associated with persistent symptoms or functional cognitive/psychological impairment. Return to work, school, and play often requires evaluation by a medical professional and is directed by published guidelines. Driving is a routine activity for most adults, but impairment can be associated with personal injury and property damage. There are no published guidelines for the return to driving. The relationship between common mTBI symptoms and driving performance is unclear, and driving simulators have been proposed as a means of objectively evaluating an individual's ability to drive. Objective: To review studies that involved the use of driving simulators in an mTBI population and provide recommendations for future research. Method: 373 articles were retrieved from PubMed with the following search criteria: (driving simulator OR simulator OR virtual reality) AND (brain injury OR mild traumatic brain injury OR mild thi OR mthi OR minor closed head injury OR minor head injury OR concussion OR brain concussion OR abi). Nine articles were found from other resources. Results: Only five small-scale studies were retrieved that assessed driving simulator performance after an mTBI. Four of the five studies were cohort studies and determined that driving simulator performance in mTBI groups was relatively impaired compared to controls. The remaining study was an occupational therapy driving intervention that compared pre- and posttest results among combat veterans with mTBIs. In total, the studies assessed 20 unique variables. There were only a few instances where variables overlapped between studies. Discrete data (e.g. number of errors) and continuous data (e.g. reaction time) were assessed. Data in some studies was gathered through observation, whereas other studies gathered automatic data from simulator software. Patient populations included adults, adolescents, and combat veterans with mT-Bls. Several studies compared neurocognitive assessments (e.g. Trail Making Test) to driving simulator performance, although no cross-study trends could be determined. None of the studies compared performance on the driving simulator to an on-road driving assessment, therefore it is impossible to know if simulator performance is predictive of on-road driving abilities. Conclusions: Driving simulators provide a unique method to assess fitness-to-drive in individuals following an mTBI. However, given the limited research in this area, it is still unknown how predictive they are of on-road driving performance. Further investigation is needed regarding what variables and methods should be included in future simulator studies to improve reproducibility and external validity.

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Cardiology

Postmyocardial Infarction Syndrome: Inpatient Contemporary Features of the Forgotten Condition in the Post Percutaneous Coronary Intervention Era

BACKGROUND: Postmyocardial Infarction Syndrome (PMIS), or Dressler's syndrome, refers to a heterogeneous group of autoimmune-mediated conditions of pericardial, epicardial and myocardial inflammation following myocardial infarction. Generally considered to be rare in the reperfusion era, the features and risk factors of PMIS are not well characterized in the contemporary era. This study aims to better characterize PMIS in the United States in recent years. Methods: Data from the National Inpatient Sample between 2012 and 2016 was queried for this study. Patient with ICD 9/10 codes 412/I25.2, respectively, were identified as having a previous diagnosis of myocardial infarction (MI). First, a univariate analysis was performed to study differences in clinical characteristics between patients with prior MI who developed PMIS (identified by ICD9/10 codes 411.0/ 124.1, respectively) versus patients with prior MI who did not develop PMIS. A multivariate logistic regression model was then constructed to determine which of the clinical and demographic characteristics were significantly associated with the occurrence of PMIS. Results: Among patients with prior MI, patients with PMIS were more likely to be younger (63.0 \pm 14.2 vs. 70.0 \pm 13.1, OR = 0.96, 95% CI = 0.96-0.97, p < 0.01), history of PCI (OR = 1.37, 95% CI = 1.15-1.63, p< 0.01) and less likely to have diabetes (OR = 0.73, CI = 0.61- 0.87, p< 0.01) and chronic kidney disease (OR = 0.57, CI = 0.46 - 0.71, p< 0.01) compared to patients with prior MI but without PMIS. Conclusion: The study highlights the potential characteristics among patients with prior MI that are associated with the development of PMIS and attempts to commemorate this slowly forgotten syndrome.

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Otolaryngology

Unilateral versus Bilateral Botulinum Toxin Injections in Adductor Spasmodic Dysphonia in a Large Cohort

The primary treatment of adductor spasmodic dysphonia is repeated injections of Botulinum toxin type A (Botox) into the thyroarytenoid muscles. Dosing can be performed into either one or both thyroarytenoid muscles. The objective of this study is to evaluate the treatment effect and side effect profile across a large number of injections. This study was performed previously in 2002 on 45 patients. This is retrospective study of all patients with adductor spasmodic dysphonia with and without tremor treated by the senior laryngologist at The George Washington University. In the current study, 272 patients (214 females and 58 males) were included in the current analysis. Duration of effect and side effects (vocal weakness and liquid dysphagia) were recorded after each injection into a database for each patient. This data was analyzed using Chi-square analysis. A total of 4023 injections (2708 bilateral and 1315 unilateral) were evaluated in this study. Optimal effect duration (greater than or equal to 3 months) was more commonly seen in the bilateral injection patients (55%) compared to the unilateral injection patients (47%) with a p=0.0001. Optimal side effect duration (less than or equal to 2 weeks) was also better for the bilateral injection patients (73%) compared to the unilateral injection patients (77%) with a p=0.023. Having both optimal effect and side effect in the same injection was more commonly seen in the bilaterally injected patients (36%) compared to the unilateral patients (33%) with a p=0.0228. This study shows that bilateral injections of Botox are more effective in producing optimal effect/ side effect profiles.

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CLINICAL AND TRANSLATIONAL RESEARCH

Cancer

Nestin Expression as a Potential Prognostic Indicator in Opisthorchis Viverrini-Associated Cholangiocarcinoma

Cholangiocarcinoma (CCA) is an aggressive cancer of the bile duct epithelium that is often not detected until patients are symptomatic. Presentation with late stage disease results in an estimated 5-year survival of less than 10 percent, as curative surgery is only possible during early stages. The Mekong region of Southeast Asia has the highest incidence of cholangiocarcinoma due to its strong associated with Opisthorchis viverrini infection. Opisthorchis viverrini is a liver fluke that leads to chronic inflammation of the biliary tract following consumption of raw fish. Individuals with the infection are often asymptomatic and do not seek treatment, which allows the infection to cause chronic inflammation leading to alterations in gene expression promoting carcinogenesis. In particular, Ov-associated CCA is significantly associated with a loss of function TP53 mutation. Due to the poor prognosis of advanced stage disease, it is critical to identify biomarkers for accurate and less invasive screening for early stage disease in high risk groups. Nestin, a neuronal stem cell protein, has been identified as a cancer stem cell. Nestin expression has been correlated with tumor grade and clinical course in many carcinomas including breast carcinoma, ovarian carcinoma, and hepatocellular carcinoma. Functioning TP53 tumor suppressor gene acts to repress Nestin by binding and inhibiting sp1 induction of Nestin expression, and TP53 mutations are associated with high Nestin expression in both hepatocellular carcinoma and cholangiocarcinoma. In this study, the applicability of Nestin as a potential biomarker and/or prognostic indicator was assessed. It was hypothesized that cholangiocarcinoma patients with advanced disease would have greater tumor cell Nestin expression and serum levels of Nestin. Immunohistochemistry was used to study tissue Nestin expression and iELISA was used to study serum Nestin levels in cholangiocarcinoma patient samples. The tissue and serum Nestin levels were then compared to patient clinical features and survival rate to evaluate an association. It was found that positive Nestin expression was significantly correlated with decreased survival (P=0.04). There was no significant association between Nestin expression and age, sex, tumor size, stage, histolology, metastasis, and recurrence in CCA patients. Furthermore, there was a significant correlation between tissue Nestin expression and serum Nestin levels determined by iELISA (P=0.026). In conclusion, positive cholangiocarcinoma tissue Nestin expression has the potential to be used as a prognostic tool to model survival. Serum iELISA analysis showed modest potential to be used as a less invasive method to evaluate Nestin expression.

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CLINICAL AND TRANSLATIONAL RESEARCH

Infectious Disease

Bacterial Functional Profiling of the Cystic Fibrosis Airway Across Clinical States

INTRODUCTION/RATIONALE: Cystic Fibrosis (CF) is an autosomal recessive disease affecting more than 30,000 people in the United States. Pulmonary exacerbations (PEx) are the most important cause of morbidity and mortality in patients with CF, yet the microbiologic cause of PEx remains widely unknown. While early whole genome sequencing studies have yielded insights into species and strain specificity, the role of bacterial functional pathways in CF PEx is understudied. We hypothesized that bacterial metabolic pathways would be associated with clinical states (PEx, end of antibiotic treatment, and follow-up). Methods: Twenty seven persons = 18 years of age with cystic fibrosis who were admitted to the hospital for a PEx were recruited to participate in this prospective observational study. Sputum and/or two oropharyngeal (OP) swabs for microbiome studies were collected at hospital admission, at the end of the antibiotic treatment course, and at the next follow up clinic appointment. Bacterial DNA was extracted, and shotgun DNA sequencing was performed. HUMAnN2 was used to evaluate bacterial pathway abundance and DESeq2 was then used to evaluate the differential abundance of bacterial metabolic pathways based on encounter time point. Results: Pathways related to bacterial metabolites were upregulated in follow-up samples when compared to PEx onset or end of antibiotic treatment samples. We found several long chain fatty acid (LCFA) biosynthesis pathways that were upregulated in follow-up samples (Figure 1). These include gondoate (log2 fold change 1.59, p=0.012), oleate (log2 fold change 1.746, p=0.048), palmitoleate (log2 fold change 1.766, p=0.043), and pathways of fatty acid elongation (log2 fold change 2.06, p=0.012). While short chain fatty acids (SCFA's) have been shown to reduce inflammation, LCFA's have previously been associated with increased lung inflammation in asthma, another important airway disease. Conclusions: While most current research on LCFA's and the lung pertain to fatty acids introduced through diet or in the lab, we hypothesize that LCFA's produced by lung pathogens in the CF airway can have a physiologic effect like gut derived bacterial SCFA's. As we found long chain fatty pathways to be upregulated in follow-up samples, LCFA's produced by bacteria in the CF lung should be studied further for potential impact on future PEx. This may help us further characterize the role of bacteria produced LCFA's on clinical states.

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Neurology

Bi-Allelic Variants in PNPLA6 Possibly Associated with Parkinsonism in Addition to Spastic Parapelgia Phenotype

Homozygous variants in the PNPLA6 gene is known to cause a spectrum of neurological disorder characterized by cerebellar ataxia and spastic paraplegia. There are no reports of this genetic condition being associated with Parkinsonism. We report a family where two siblings affected with this condition developed Parkinsonism in their adulthood. The proband is a 50 year-old woman of Eastern European Jewish decent who presented with worsening bilateral stiffness of lower limbs exacerbated by walking. She reported having normal development until age 3 where her feet turned in and she began to walk on her toes. She was walking independently but had to use a cane. Her eldest brother was affected more severely; gait was developing normally until age 3, when his legs turned in and was unable to walk in adulthood. He, additionally, developed tremor and was treated with carbidopa/levodopa. Her older sister was also affected and was wheelchair bound by adulthood. On physical exam, proband had pronounced end-gaze nystagmus, saccadic instrusion into smooth pursuits, and square wave jerks. She had mild right upper limb rigidity, bilateral lower limb spasticity and hyperreflexia with bilateral Babinski signs, and a wide-based, waddling gait with short stride, excessive plantarflexion and decreased right arm swing. Over 3 years, she also developed right hand rest tremor, slight bradykinesia and mild dystonic posturing of the right hand. MRI brain and spine were unrevealing. EMGs were non-diagnostic. A trial of levodopa caused some reported improvement in mobility. Genetic testing revealed compound heterozygous variants in the PNPLA6 gene [c.3889C>T (p.Pro1297Ser) and c.3190G>A (p.Ala106Thr).] Dopamine Transporter (DAT) scan was completed to assess for Parkinsonism; which showed decreased tracer activity in bilateral putamen, left>right, consistent with deficit in dopaminergic transmission, indicative of parkinsonian syndrome. To the best of our knowledge, there have been no reports of this genetic condition being associated with parkinsonism. Our proband and her brother developed extrapyramidal symptoms in their adulthood; which responded partially to carbidopa/levodopa therapy. DAT scan confirmed dopaminergic denervation. Testing for hereditary forms of parkinsonism was negative. It appears that PNPLA6 related neurological disorder may be associated with development of extrapyramidal symptoms in 4-5th decades of life. Given the rarity of this neurogenetic condition and lack of longitudinal studies, there is limited information about the natural history. We propose that adults with this condition should be evaluated for parkinsonism, which could be related to worsening in their neurologic symptoms and may be treatable.

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CLINICAL AND TRANSLATIONAL RESEARCH

Emergency Medicine

Resource Utilization among Patients Presenting to the Emergency Department

BACKGROUND: Stroke is a common, devastating, neurological condition, that carries high rates of morbidity and mortality. Acute ischemic stroke is time-sensitive with earlier treatment and interventions resulting in more favorable outcomes. Rapid triage in the field and clinical and diagnostic evaluation in the emergency department (ED) is paramount and the approach to management may vary depending on timing of presentation. Our objective was to describe patient characteristics, pattern of ED arrival, and ED resource utilization among patient presenting to ED with stroke symptoms. Methods: A retrospective chart review was conducted in a single, urban, academic ED between September 2009 and 2019, examining adult patients with ischemic stroke. Within this patient population, we evaluated demographic characteristics, arrival time, last known well to ED arrival time, mode of transport, thrombolytic agents use, initial NIHSS, door to imaging time, and door to tPA administration. Chi square and analysis of variance or the Kruskal-Wallis test were used to examine associations. Results: We identified 2872 cases of ischemic stroke. The mean age was 64 ± 14 years and 52% of cases were male. Time of arrival was significantly associated with diagnosis (p<0.0001). Patients with ischemic stroke had more variability in their time of arrival, peaking between 09:00 AM and 19:00. Among patients with ischemic stroke, 781 (27%) arrived by private vehicle. Advance notice by emergency medical services (EMS) was provided in 49% of patients with ischemic stroke. Mean NIHSS score was 7.1 ± 7.1. 415 (14%) received tPA. Those who arrived by EMS were significantly more likely to receive tPA (18%) than those who arrived by private car (6%)(p<.0001). Receiving tPA was significantly associated with arrival time (p<.0001). Conclusion: Time of day and mode of arrival appear to influence treatment with intravenous tPA. Over one fourth of ischemic stroke patients arrived to the ED by private transportation and half of patients transported by EMS to the ED did not have prehospital advanced notification. Identifying ways to best educate patients and EMS personnel on stroke presentation and the importance of advance notification and prompt arrival to the ED remains important. With more advance notice of patient presentation, proper resource allocation and utilization can aid in quicker intervention and ultimately better patient outcomes.

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Infectious Disease

Management of Addiction and Clinical Outcomes among Patients Injection Drug Use-Associated Infective Endocarditis Treated at a University Hospital, 2012-2018

One of the most feared complications of injection drug use is infective endocarditis -- a bacterial or fungal infection introduced into the bloodstream through injection, which can damage the heart valves and spread to other organs, resulting in extensive damage and even death. The treatment of infective endocarditis among people who actively inject drugs is difficult due to the frequency of relapse with drug use, resulting in incomplete treatment and repeat infections. These lead to prolonged hospitalizations and repeat surgeries, which extract a high toll in human suffering as well as healthcare costs. While some hospitals have developed standardized pathways to enroll patients who are hospitalized for infective endocarditis in association with injection drug use (IDU) in addiction treatment, no such routine pathway currently exists at our hospital. Our study aims to determine what proportion of patients treated for IDU-associated infective endocarditis in 2012-2018 at our hospital received treatment for drug addiction, and whether the outcomes of treatment for endocarditis differed between those who were treated for addiction and those who were not. Patients have been included in the chart review if they were hospitalized between 2012-2018 with a diagnosis of both endocarditis and injection drug use or addiction. Primary outcome measures include organism of infection, antibiotics used, whether surgery was done or not, whether the patient had reinfections, and what type of treatment was used to treat the drug abuse if any. The results are still being determined. Our hypothesis is that those treated for addiction had lower mortality, fewer readmissions, and fewer new valve infections in the year following treatment. When our hypothesis is confirmed there is the possibility of a following prospective study in which patients who present with IDU-associated infective endocarditis are given the opportunity to start treatment for their addiction, to further explore the ways in which addiction treatment can improve the outcomes of IDU-associated infective endocarditis.

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Cardiology

Long-term Cardiac Remodeling and Complications After Minimally Invasive LVAD Discontinuation for Myocardial Recovery

Left ventricular assist devices (LVADs) through mechanical unloading can lead to cardiac reverse remodeling and in select individuals culminate in myocardial recovery permitting deactivation of LVAD support. LVAD discontinuation using a minimally invasive surgical approach where the device is left in-situ has been reported by our group to be safe in short-term with respect to risk of thromboembolism or infection. Whether this approach is safe long-term and affects the sustainability of recovery is unknown. This is a single-center analysis from December 2011 to November 2018 of 10 patients who had minimally invasive LVAD discontinuation with LVAD left in-situ in the setting of myocardial recovery. Patients were followed with serial echocardiography for up to 2 years post-LVAD discontinuation and monitored for recurrent heart failure, infection, or thromboembolic complication. At time of LVAD deactivation, the mean age of patients was 41.1+/- 15.5 years, 50% were females, and all but one had a non-ischemic cardiomyopathy. Prior to LVAD deactivation, wedge pressure was 14+/-7.2mmHq, cardiac index 3.0+/-1.2L/m2, and peak VO2 19.4+/- 5.9mL/kg/min during an LVAD turndown study. Median LVAD support prior to deactivation was 21.5 months (range 5.4 to 88.3). All 10 patients had the LVAD left in-situ with the outflow graft ligated and driveline divided. Mean LVEF was 53.6+/-7.8% prior to deactivation and LVIDD was 4.5+/-0.7 cm. At 24 months, average LVEF had fallen to 39+/-10.8% while average LVIDD had increased to 5.6+/-1.3 cm. Two patients (20%) had recurrent heart failure within 12 months and required cardiac transplantation. Eight (80%) patients were alive without a heart failure hospitalization or need for LVAD or transplant at 2 years. One patient had the device completely explanted for a persistent driveline infection at 13 months and another at 12 months who developed an inflow cannula thrombus. This patient was later found to have a prothrombin gene mutation. LVAD discontinuation with the device left in-situ following evidence of myocardial recovery is associated with an 80% survival free of LVAD, transplant, or death at two-years. A minority of these patients suffered from a thromboembolic complication and/ or recurrent infection. These data show that LVAD discontinuation without device explant for myocardial recovery appears to be safe for patients without a history of major infections or underlying hypercoagulable condition. Whether leaving the device in-situ leads to long-term adverse remodeling should be explored in future analyses.

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Mental Health

Reproductive Health in an Inpatient Psychiatric Unit

Patients with psychiatric diagnoses are more likely than their peers to experience unwanted pregnancy and as many as one third of women with severe mental illness who do not want to conceive, do not use any form of contraception. Abrupt cessation of psychotropic medications in pregnancy leads to high rates of relapse among women with mental illness. Additionally, psychiatric illness during pregnancy is associated with poor obstetric outcomes, as well as lower participation in prenatal care. There is scant information in the literature describing counseling provided to women of reproductive age in the inpatient psychiatric setting. The focus of this study was to determine whether and how reproductive health issues, including potential impacts of psychotropic medications on pregnancy, were discussed with women of child-bearing age on an inpatient psychiatric unit. A retrospective search was conducted for women between the ages of 18-49 at the time of admission, over a six-month period. 148 unique encounters were identified, and charts were reviewed for information regarding: discharge medications, medication counseling, contraceptive use, pregnancy and relationship status, pregnancy history, nature of OB/GYN consults, substance use and diagnoses. Of the patients, 19.6% were discharged with at least one teratogenic medication and a majority of patients had recent substance use. However, only 7.4% of patients were asked about contraceptive use were asked about contraceptive use and only 1 case had documented discussion of reproductive effects of medication. Few women of reproductive age admitted to the inpatient psychiatric unit were counseled on reproductive health, including known side effects of teratogenic medications. This indicates a need for inclusion of reproductive health, including counseling on the risks and benefits of taking psychotropics in the peripartum period, into mental health care.

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CLINICAL AND TRANSLATIONAL RESEARCH

Cancer

Spectrum of [18F]FDG-PET/CT Findings in Benign Lymph Node Pathology

Diffuse lymphadenopathy has a long differential diagnosis that includes both malignant and benign causes. As part of the lymphadenopathy work-up, many patients undergo 18F-FDG PET/CT for the purposes of ruling out malignancy. This exhibit will illustrate the spectrum of nodal findings on FDG PET/CT with correlation to other cross-sectional imaging and clinical history in patients with representative benign lymphoproliferative disorders and infectious, inflammatory, and other miscellaneous causes. These findings are important for the nuclear medicine radiologist as they can represent common pitfalls in the work-up of diffuse lymphadenopathy. While FDG-PET cannot rule in a disease process, it can rule out certain diseases in certain patient populations, which will be presented as well.

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Neurology

Mutant Huntingtin Disrupts the Nuclear Pore Complex

Huntington's disease (HD), the most common inherited neurodegenerative disease, is caused by an expanded CAG repeat in the first exon of the Huntingtin (Htt) gene, resulting in progressive degeneration of striatal medium spiny neurons. Disease onset and severity are dependent on CAG repeat length. The mechanism(s) by which mutant Htt (mHtt) causes the disease have not been fully elucidated. The trafficking of RNA and proteins between the cytoplasm and the nucleus is a critical aspect of signal transduction and is especially arduous for neurons due to their highly polarized biology. Efficient regulation of this process is mediated by the Nuclear Pore Complex (NPC), an extraordinary molecular machine that serves as the main gateway to the nucleus. In order for any cell to function properly, it is imperative that RNA and protein be efficiently and selectively exchanged between the nucleus and the cytoplasm. This critical task is achieved by the ~2000 NPCs that span the entire nuclear envelope. Each NPC consists of multiple copies of 30 different protein subunits called Nucleoporins (NUPs) that differ in anatomical location, function, domain, post-translational modification and residence time. Mutations in various NUPs result in tissue-specific diseases. Interestingly, some of the longest-lived proteins in the mammalian brain are specific NUPs and may represent the "weakest link" in the aging proteome. Prior studies offered clues that mHtt may disrupt nucleocytoplasmic transport and a rare mutation of a specific NUP can cause HD-like pathology. Given these, we extensively evaluated the NPC and nucleocytoplasmic transport in multiple models of HD including various transgenic and knock-in mouse models, human adult and juvenile HD brain regions, HD iPSC derived neurons, and primary neurons transfected with full length mHtt. Collectively, our models display severe mislocalization and aggregation of NUPs that co-localize with mHtt, a disruption in the energy gradient that fuels nuclear trafficking, and increased nuclear permeability indicating a defect in the gating of the NPC. Repeat-associated non-ATG translation, which has been shown to disrupt nucleocytoplasmic transport in C9orf72 ALS-FTD, also occurs in HD and disrupts nucleocytoplasmic transport. Our studies show that products of the mHtt repeat expansion are likely to disrupt nucleocytoplasmic transport at the NPC. Additionally, drugs that prevent aberrant NUP biology also mitigate this transport defect and neurotoxicity. This study suggests that the NPC is disrupted in HD and offers novel therapeutic targets.

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Neurology

Dynamic Components of Nucleocytoplasmic Transport are Selectively Disrupted and can be Rescued in C9orf72-ALS/FTD and sALS

An expanded hexanucleotide repeat [GGGGCC] in intron 1 of the C9orf72 gene is the most common cause of familial and sporadic Amyotrophic lateral sclerosis (ALS) and Frontotemporal dementia (FTD). Our group and others simultaneously discovered that dysfunction in nucleocytoplasmic transport may be a fundamental pathway for C9orf72-ALS/FTD pathogenesis. While it is clear that nucleocytoplasmic transport is disrupted in various models of C9orf72-ALS/FTD, what is still undetermined are the specific components of this pathway that may be selectively affected in disease, how exactly their disruption contributes to disease pathogenesis, and whether these unique defects can be rescued. Therefore, we evaluated in detail various components of the nuclear pore complex and nucleocytoplasmic transport machinery in human, mouse, and fly models of C9orf72-ALS/FTD using immunostaining, western blot, proteomics, RNA-seq, and siRNAs. These studies revealed that specific components of the nuclear pore complex and nucleocytoplasmic transport machinery are disrupted and are potent genetic modifiers in C9orf72-ALS/FTD and sporadic ALS (sALS) and can be rescued either using antisense oligonucleotides, overexpression of Ran-GTPase, or by increasing levels of O-GlcNAcylation.

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Cardiology

Cardiac Magnetic Resonance with Parametric Mapping to Predict Rejection in Pediatric Heart Transplant Recipients

Evaluation of rejection in heart transplant recipients requires recurrent endomyocardial biopsies (EMB). This invasive procedure is the current gold standard, though limited in sensitivity as biopsies are traditionally taken at random along the myocardium. EMB yield can be optimized by utilizing live MRI-guided cardiac catheterization to target "hotspots" of inflammation/scarring through parametric mapping, especially relevant to pediatric transplant recipients, as the use of MRI limits radiation exposure. This study aims to: i) validate a novel method for mapping myocardial inflammation/fibrosis, ii) establish normative myocardial values across a diverse pediatric population, and iii) quantify fibrosis in EMB sections to be correlated with MRI-based parameters. Parametric mapping was performed in pediatric patients (n=41, median age 18 years) undergoing clinical cardiac MRI scans. A myocardial "map" was generated that represented areas of fibrosis in T1-weighted, or edema in T2-weighted scans, with corresponding levels of intensity. Regions of interest were manually drawn to quantify T1 and T2 values in the lateral and septal walls of the left ventricle. A novel saturation-recovery based (SA-SHA) MRI sequence which combined T1 and T2 acquisitions, in a free-breathing subject, was compared to the standard inversion-recovery (MOLLI) sequence that requires separate breath holds for each acquisition. Preliminary data supported the use of free-breathing SASHA mapping, with a strong positive correlation with breath-held SASHA T1 (r = 0.72, p < 0.01) and T2 values (r = 0.76, p < 0.01), and moderate positive correlation with traditional breath-held MOLLI values - higher in T2 (r = 0.64, p < 0.01) compared to T1 values (r = 0.46, p < 0.01). The application of free-breathing acquisition is significant; it reduces the need for patient compliance and mechanical ventilation under anesthesia in a pediatric population. Chronic rejection in a historical cohort (n=200) of pediatric heart transplant recipients was analyzed through histopathological fibrosis quantification. Collagen in EMB specimens was selectively stained with PicroSirius Red to calculate a collagen volume fraction, the proportion of fibrosis to total cardiomyocyte area. An automated quantification method was developed through ImageJ to optimize efficiency, validated with a moderate positive correlation with manual quantification (r=0.66). In the next phase, fibrosis burden will be correlated to rejection events/ graft loss within the historical cohort. Ultimately, MRI hotspots from parametric maps will be prospectively correlated with histopathologically quantified fibrosis in EMB sections, as MRI-guided catheterization is employed with the end goal of reducing risk and improving outcomes for the pediatric transplant population.

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CLINICAL AND TRANSLATIONAL RESEARCH

Obstetrics and Gynecology

Maternal and Neonatal Outcomes in Women Undergoing Breech Trial of Labor

At the George Washington University, we have established a Vaginal Breech Initiative to reduce overall Cesarean Delivery rate. This is done by normalizing vaginal breech delivery through increased access to, and training in, vaginal breech delivery, thereby reducing Cesarean-associated morbidity. The purpose of this study was to test the efficacy of utilizing experienced providers with strict antenatal and intrapartum guidelines to safely deliver vaginal breeches. We hypothesize that allowing a breech trial of labor (TOL) does not compromise maternal or neonatal outcomes. We performed a retrospective chart review of all women coded breech at our facility between 8/2011 and 6/2019. Our primary outcome measure was successful breech vaginal delivery in all women undergoing breech trial of labor. Our secondary outcome measures include incidence of adverse maternal and neonatal outcomes. Of all women undergoing a breech TOL (n=63), we had a 77.8% success rate of vaginal breech delivery, 7.9% experienced postpartum hemorrhage, and 3.2% experienced a 3rd degree or greater laceration. 81% of neonates born to a mother who underwent a breech trial of labor had no adverse outcomes. Of those who did have adverse outcomes, 9 were admitted to the NICU (7 of which were delivered vaginally), 6 required CPAP for greater than 5 minutes, 1 had a brachial plexus injury, and 1 had a subdural hemorrhage. There was 1 incidence of head entrapment, but no incidences of death or cooling. Vaginal delivery can be a safe alternative to cesarean delivery of the breech fetus. Based on our experience, an institution seeking to offer vaginal breech delivery should designate a highly trained vaginal breech team and create a protocol to determine appropriate candidates for breech TOL in order to optimize success rate and minimize adverse outcomes.

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Neurology

Cellular and Microstructural Brain Alterations in a Piglet Model of Cyanotic Congenital Heart Disease

Significant neurodevelopmental delay is emerging as one of the most important current challenges for patients with congenital heart disease (CHD). Previous clinical studies demonstrate that reduced oxygen delivery due to CHD results in subnormal brain development. The piglet brain is a powerful tool to study human brain development. We hypothesize that studies using the piglet model of chronic cerebral hypoxia will allow us to understand the underlying cellular events of chronic hypoxia in perpetuating neurodevelopmental damage in children with CHD. This study aims to evaluate the effect of chronic hypoxia on piglet brains through histological, DTI (diffusion tensor imaging) and NODDI (neurite orientation dispersion and diffusion imaging) analyses to determine the regional difference in the brain damage in CHD. Piglets were exposed to either chronic hypoxia (10.5% O2: H(x) group, n=12) or sham hypoxia (21% O2: N(x) group: n=12) from P3 to P14. Six piglets from each group were euthanized at day 14 (2-week N(x) and 2-week H(x)), and another 6 piglets from each group were subjected to grow under normal oxygen conditions from day 14 to 6 weeks of age (6-week N(x) and 6-week H(x)). Brains were extracted from piglets and examined using 1) immunohistochemical assays (Olig2+, CC1, PDGFR-a) to assess the cellularity alterations in white matter following chronic hypoxia, and 2) DTI (including FA, AD, RD, and MD1 images) 1 FA (Fractional Anistropy), AD (Axial Diffusivity), RD (Radial Diffusivity), MD (Mean Diffusivity) and NODDI (including NDI, ODI, and KAPPA2 images) neuroimaging techniques. MRI-based piglet brain atlases were applied on DTI and NODDI images to evaluate structural differences between Hx and Nx brains. 2-week Nx brains revealed a significant increase in the density of CC1-positive cells compared to 2-week Hx brains in white matter. A significant increase of fractional anisotropy (FA) intensity was also observed in the peripheral white matter of Nx brains compared to Hx brains at 2 weeks. Central deep white matter revealed a significant decrease in FA intensity in Hx brains vs Nx brains at 6 weeks. Radial diffusivity (RD) mapping demonstrated a significant increase in the right anterior cortex in between 2 week Nx and Hx brains. ODI mapping also revealed a significant increase in central white matter regions between 2 weeks Nx and Hx. The results reveal cellular and microstructural alterations after chronic hypoxia between deep and peripheral regions in the white matter. This model can contribute to human brain imaging.

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Neurology

Assessment of Non-routine Events and Significant Physiological Disturbances during Resuscitation Following Pediatric Head Trauma

BACKGROUND: Outcomes following pediatric traumatic brain injury (TBI) depend on injury severity and secondary injury prevention. Post-injury hypoxia, hypotension, and hyperventilation are associated with increased mortality therefore guidelines exist for maintenance of normal physiology. Non-routine events (NREs) are workflow deviations that have been associated with significant physiological disturbances in other acute settings. We hypothesized that NREs are associated with abnormal physiological measures during the resuscitation of children with TBI. Methods: We reviewed trauma resuscitation videos involving children with suspected TBI and Glasgow coma scale (GCS) <13. NREs between patient arrival and patient departure were identified and severity was "major" if the potential for harm was high and "minor" if low. Physiological disturbances were identified using vital sign monitor data. Linear regression was used to calculate associations between NRE rate and proportion of the case with hypoxia, hypotension, or tachypnea. Results: Among 26 patients, 12 had moderate TBI (GCS <13) and 14 had severe TBI (GCS <9) (median=7.5, IQR 3.5-10). Seventeen patients required intubation. A total of 604 NREs were severe TBI (GCS <9) (median=7.5, IQR 3.5-10). Seventeen patients required intubation. A total of 604 NREs were identified (median=23, IQR 17-27.8 per case). Major NREs accounted for 22.7% (n=137) of the events (median=5, IQR 3-7 per case). Twenty-five patients had at least one vital sign abnormality during their resuscitation with the most common being tachypnea (n=18, 69.2%) and hypertension (n=17, 65.4%). Eight patients had hypoxia, four had hypotension, and one had both. We observed no association between the proportion of time with hypoxia, hypotension, and tachypnea and the rate of NREs (overall and major) per minute. Discussion: NREs and significant physiological disturbances were common in the initial resuscitation of children with moderate to severe TBI. Episodes of hypoxia and hypotension are not associated with NRE rate, however, conformance with resuscitation guidelines and maintenance of normal physiology in the early post-injury phase is needed to optimize outcomes following TBI.

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CLINICAL AND TRANSLATIONAL RESEARCH

Infectious Disease

Towards a Better Catheter

Despite preventative measures, catheter acquired urinary tract infections (CAUTI) lead to 10,000 deaths per year. Though measures such as silver lined catheters have been trialed to prevent biofilm growth on catheters, there hasn't been any major success in the reduction of CAUTIs. Urinary tract infections can be caused by bacterial biofilm growth on catheters. Patients are treated with systematic antibiotics but that doesn't rid of the bacterial growth on the catheter and the biofilm can lead to a reoccurring infection. Aurachin D is quinolone alkaloid extracted from the bacteria Stigmatella aurantiaca and inhibits the growth of gram positive bacteria, some yeasts and molds. It is an antibiotic that inhibits the eukaryotic respiratory chain, though the mechanism is not fully understood (Kunze 1987). It blocks NADH oxidation in the mitochondrial respiratory chain and is cytotoxic (Xu-Wen 2013). Unfortunately, there is not a lot of data on Aurachin D being used for antibiotic purposes, and the goal of this project was to discover whether Aurachin D could be used to coat catheters in an effort to prevent biofilm growth. In order to determine that Aurachin D would stop the growth of biofilm, infected urine was used to grow biofilm on silicone plates, and some plates were treated with Aurachin D. Each plate was treated with fluorescent dye for optimal visualization. The plates were incubated for four days at body temperature and then visualized under a confocal microscope. Unfortunately, there were a lot of control plates and Aurachin plates that did not grow bacteria at all. In order to determine whether Aurachin D is bacteriacidal, biofilms have to be created using laboratory techniques and at this time that was not possible. The results were inconclusive, but a protocol to properly stain and create biofilms is being trialed.

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CLINICAL AND TRANSLATIONAL RESEARCH

Infectious Disease

Microbiology of Acute Hematogenous Osteomyelitis in Hospitalized Children

BACKGROUND: Acute hematogenous osteomyelitis affects 1 in 5,000 children the in the U.S. and Staphylococcus aureus is by far the most common bacterial cause. At our institution, clindamycin is used empirically for osteomyelitis, despite increasing clindamycin-resistance over the years. Objective: To describe microbiologic results and antibiotic resistance patterns in children hospitalized with acute hematogenous osteomyelitis. Design/Methods: This was a single center retrospective cohort study of patients <21 years of age with acute osteomyelitis hospitalized between 1/1/2010 and 5/31/2019 at Children's National Hospital. We excluded patients with recent orthopedic surgery, hardware infection, penetrating trauma or with an underlying immunocompromising condition. We performed chart review to collect data on location of infection; blood, synovial fluid, or surgical site cultures; and culture results and susceptibilities. Results: Of the 162 encounters of acute osteomyelitis that met inclusion criteria, the average patient age was 8.3 years. Lower extremity infections were most common (105, 64.8%), followed by Upper extremity (31, 19.1%), pelvis (14, 8.6%), spine (7, 4.3%), shoulder (4, 2.5%), rib (1, 0.6%) and mandible (1, 0.6%). Almost half of encounters (73, 45%) had no positive cultures, and 89 encounters (55%) had at least one positive culture from blood or local source (Figure 1). The most common pathogen among all culture groups was methicillin susceptible S. aureus (MSSA) followed by methicillin resistant S. aureus (MRSA) groups was methicillin susceptible S. aureus (MSSA) followed by methicillin resistant S. aureus (MRSA) composing 60 (67%) and 19 (20%) of culture-positive infections respectively. Other isolated pathogens included S. pyogenes (5, 5.6%) Salmonella species (2, 2.2%), S. pneumoniae (1, 1.1%), S. agalactiae (1, 1.1%), and Kingella kingae (1, 1.1%) (Figure 1). Among S. aureus infections, 69 (87%) were susceptible to clindamycin (85% among MSSA, 95% among MRSA). Conclusions: Almost half of all children with acute hematogenous osteomyelitis did not have any microbiologic data to guide antibiotic usage. S. aureus is the most common (87%) isolate, with more MSSA (74%) than MRSA (24%). Non-S. aureus isolates were more likely to grow from surgical specimen cultures than from blood cultures. Clindamycin resistance was more commonly seen in MSSA than in MRSA osteomyelitis.

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CLINICAL AND TRANSLATIONAL RESEARCH

Neurology

Neurodevelopmental Screening Among Premature Infants following Patent Ductus Arteriosus (PDA) Ligation

Patent Ductus Arteriosus (PDA) arises when a fetal cardiac structure remains open after birth. PDA affects about 50% of preterm infants born before 32 weeks of gestation. Surgical ligation of PDA is significantly associated with neurodevelopmental impairment (NDI) at age two. Patients who receive secondary surgical ligation also demonstrate greater NDI than those who receive indomethacin treatment alone. Our objective was to determine the prevalence of neurodevelopmental abnormalities in premature infants following PDA ligation while assessing the correlation between preoperative indomethacin treatment and postoperative neurological findings. A three-year retrospective chart review of preterm infants who received PDA ligation at a tertiary pediatric hospital was performed. Fifty-four patients were identified (27M/27F; mean [SD] gestational age: 25.2 [2.74] weeks). Information regarding preoperative indomethacin use and postoperative consultations in neurology, child development, and physical medicine and rehabilitation (PM&R) were extracted from patient charts. Head ultrasounds (HUS) and magnetic resonance imaging (MRI) data were re-evaluated for intraventricular hemorrhage (IVH), periventricular leukomalacia (PVL), ventriculomegaly, and hydrocephalus. Out of fifty-four patients, seven infants (13.0%), who demonstrated worse or mixed postoperative ventriculomegaly and hydrocephalus findings, had not received indomethacin prior to surgical ligation. Additionally, only thirty-two infants (59.3%) received postoperative consultations in child development, neurology and/or PM&R. Out of those, twenty-nine infants (90.6%) exhibited developmental delay and/or neurological abnormalities on their first visits. Only three patients (9.4%) developed normally across all domains without any significant neurological abnormalities. In conclusion, the retrospective chart review demonstrated a potential correlation between the lack of preoperative indomethacin treatment and worse or mixed postoperative neurological findings. Additionally, a majority of postoperative follow-ups revealed neurodevelopmental abnormalities. Although preterm infants selected for surgical ligation may have a higher pre-ligation risk for NDI, the reported prevalence of neurodevelopmental abnormalities may also be underestimated due to the lack of postoperative follow-ups. Thus, the study highlights the need for improvement in neurodevelopmental screening protocol for preterm infants following PDA ligation.

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Gastroenterology

An Age-Related Syndrome: Obturator Bladder Hernias

CASE: An 86-year-old widow accomplished equestrian complained of intermittent abdominal pain associated with constipation, vomiting, and diarrhea. She sought medical evaluation at multiple facilities. At one Emergency Department visit, she was diagnosed with diverticulitis and prescribed a ten-day course of antibiotics. Her health was otherwise good except from chronic low body mass (BMI 14.9 kg/m2). Her third abdominopelvic CT scan in a span of six weeks revealed bilateral obturator hernias with segments of the urinary bladder herniating through each. As urinary bladder hernias are typically asymptomatic, this ended up being an incidental finding. The patient eventually adjusted to a new bowel regimen, and her gastrointestinal complaints resolved. Her general surgeon recommended watchful waiting. Discussion: Obturator hernia is a rare type of hernia of bowel or bladder migrating through the obturator canal, adjacent to the obturator vessels and nerve. It is typically found in thin elderly women and may be associated with a high mortality rate due to delayed diagnosis. 1 When bowel contents herniate and develop ischemia, emergency surgery is required. This case of bilateral obturator bladder hernias illustrates how obturator hernias may often be overlooked. This patient's presentation of bowel symptoms did not match the severity of bowel obstruction and did not present as an acute abdomen needing emergency intervention. For future care, knowledge of the potential for obturator hernias is key to assisting Emergency Medicine providers to accurately assess any abdominal complaints. Conclusion: Obturator hernias could be included in the differential diagnosis for thin older women with nonspecific abdominal symptoms. References: 1. Igari K, Ochiai T, Aihara A, Kumagai Y, Iida M, Yamazaki S. Clinical presentation of obturator hernia and review of the literature. Hernia. 2010;14(4):409-413. 2. Curry N. Hernias of the Urinary Tract. In: Clinical Urography. Vol 3. 2nd ed. United States of America: W.B. Saunders Company; 2000:2981-2991.

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Neurology

Autonomic Tone in Preterm Infants Correlates with Morbidity of Prematurity

OBJECTIVE: To compare autonomic nervous system (ANS) development in infants without significant morbidity of prematurity (group 1) vs. those with (group 2). Methods: We compared ANS tone in 114 preterm infants using heart rate variability (HRV) analysis obtained weekly from NICU admission to discharge. Normalized low frequency (nLF) and alpha 1 characterized sympathetic tone. Normalized high frequency (nHF) characterized parasympathetic tone. Median regression with a group by time interaction term modeled ANS maturation and evaluated differences in maturation rates. Results: Group 1 (n=68) had a mean (SD) birth GA of 30.5 (2.5) weeks and a NICU stay of 52.4 (29.5) days. Group 2 (n=46) had a birth GA of 27.7 (2.5) weeks and a NICU stay of 93 (60) days. Birth GA did not differ between groups (p=0.08). There was a difference in the slope of the trajectories of alpha 1 (p=0.000), nLF (p=0.02), and nHF (p=0.02) between groups. Alpha 1 was initially lower in group 2 (p=0.000), but values were similar between groups at discharge. Admission nLF was similar between groups, but higher in group 2 at discharge. Group 2 nHF was higher at admission and lower than group 1 at discharge. Conclusions: ANS maturity impacts regulation of stress responses and may play a role in neuropsychiatric outcomes. Our data suggest that medically complex infants have lower sympathetic tone at admission and may have less robust parasympathetic development over time. Understanding ANS function may lead to treatments that improve short- and long-term outcomes in preterm infants in the future.

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Neurology

Facial Nerve Dysfunction after Mandibular Distraction Osteogenesis in Patients with Robin sequence: A Systematic Review

PURPOSE: Robin Sequence (RS), characterized by the triad of micrognathia, glossoptosis, and upper airway obstruction (UAO), is an increasingly recognized diagnosis. An effective yet invasive surgical airway intervention is mandibular distraction osteogenesis (MDO). An established complication of MDO that has not been systematically documented is facial nerve dysfunction. We seek to analyze available evidence regarding this surgical complication. METHODS: PubMed, MED-LINE, SCOPUS, CINAHL were queried to 2019 with the terms "distraction osteogenesis" and "Robin Sequence". Systematic reviews, letters, non-English papers, and papers including patients with congenital VII palsy or hemifacial microsomia were excluded. Extracted data included device type, distraction length/rate, latency and consolidation periods. Outcome measures included affected facial nerve branches, onset and recovery time of facial nerve dysfunction, laterality and permanence of facial nerve injury. RESULTS: Of the 238 studies identified, 23 met the inclusion criteria, yielding a total of 794 patients with RS, 65% of whom had an associated syndrome. Distractor types included 68.2% internal devices, 9.1% external devices, and 13.6% both internal and external devices, and 9.1% un-specified devices. Furthermore, some studies mentioned distraction length as a rate with an undefined date range, and other studies indicated the total distraction length. The average latency and consolidation periods were 1.70 days and 53 days, respectively. Reported facial nerve palsy ranged from 0.4%-22%. The involved branches included the marginal mandibular (50%), common trunk (31.8%), buccal (9.1%), zygomatic (4.5%) branches, and 4.6% unknown. Only 7 studies documented the timing and/or duration of facial nerve dysfunction; these findings varied widely from palsy noted immediately after placement of distractors to dysfunction noted during distraction to asymmetry documented during consolidation. The time to resolution for temporary facial nerve palsy also varied significantly, from occurring during the perioperative period to several months. Reported permanent facial nerve dysfunction ranged from 3.8% to 15.9%, with the marginal mandibular branch being most commonly involved. CONCLUSION: Facial nerve dysfunction after MDO for UAO in patients with RS is reported inconsistently. Timing and recovery also varied, when documented. While the marginal mandibular branch was most commonly involved, other facial nerve branches are also at risk for injury. Our review underscores the need for more consistent and detailed descriptions of this potential complication associated with an increasingly popular surgical procedure, with the goals of elucidating the mechanism of facial nerve dysfunction after MDO and mitigating the risk for this injury.

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Otolaryngology

A Novel Technique for Automated Detection and Classification of Suprahyoid Head and Neck Lesions and Lung Nodules in High-Resolution CT Scans

Early and accurate detection of pulmonary and suprahyoid lesions is vital to maximizing patient survival and quality of life. In the United States alone, approximately 225,000 patients are diagnosed with lung cancer each year. Undetected pulmonary lesions can significantly precipitate patient mortality. Furthermore, the presence of sialoliths, which are characterized by a similar CT appearance, affects 12 of every 1,000 adults. If left untreated, sialolithiasis can result in infection, inflammation, and subsequent fibrosis and glandular atrophy under chronic conditions. We present a novel approach to automatically detect lung nodules, which demonstrate lobulated, irregular, and/or spiculated morphology, and suprahyoid lesions, which share similar variable appearance, in high-resolution Computed Tomography (CT) images that is robust against spatial and temporal variations in background noise and lesion size and morphology. This is accomplished by adjusting the detection threshold dynamically, based on the local noise statistics around each pixel. Noise variations present a challenge to common, global-thresholding and shape-based detection algorithms. However, the modified CA-CFAR (cell-averaging constant false alarm rate) detector that we propose has the potential to adapt while maintaining a high level of performance. The robust nature of CA-CFAR is especially useful in the detection of microscopic (<2mm) calcifications, which often present as radio-opaque sublingual, submandibular, and parotid calculi. In the present study, the performance of the CA-CFAR algorithm was assessed using publicly available databases; namely, the ELCAP Public Lung Image Database for pulmonary pathologies and The NIH Cancer Imaging Archive (TCIA) for otolaryngological pathologies, respectively. A set of 10 CT images with an average of 20 lesions were each obtained from the ELCAP and NIH TCIA databases, and preliminary results from the CA-CFAR lesion detection algorithm on head and neck CT images revealed an average Probability of Detection (Pd) of 86.8% and probability of false alarm (Pfa) preprogrammed to approximately 20%. The probability of detection for lung nodules were slightly better (90.6%), which is most likely attributed to the presence of fewer bony structures and greater parenchyma in pulmonary CT scans compared to suprahyoid CT scans.

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Cancer

Ribavirin, DZNeP, and Decitabine as Potential Therapeutics for Chordoma

Chordoma is an aggressive bone sarcoma of the skull base and sacrum that often presents late into disease progression. Over 30% of patients develop metastases, and ten-year survival rates remain approximately 50-60%. There are no currently FDA-approved treatments, leaving surgical resection and radiation as mainstays of treatment. Introducing new therapies for chordoma ultimately represents a substantial unmet medical need. We explored ribavirin, an anti-viral drug approved to treat hepatitis C, as a potential therapeutic for chordoma, given prior evidence of anti-tumor effects against other tumor lines. Ribavirin inhibits eukaryotic initiation factor 4E (eIF4E), known to be overexpressed in 30% of all cancers; almost all human chordomas show immunoreactivity to eIF4E and its phosphorylated form. However, as ribavirin has multiple cell targets, we also investigated it in combination with DZNeP, a small-molecule inhibitor which inhibits the histone methyltransferase EZH2, implicated as a driver in numerous cancer types. We further explored DZNeP in combination with decitabine, an inhibitor of DNA methyltransferase. Sacral (U-CH1) and clival (UM-Chor1) chordoma cell lines were utilized for in vitro experiments and treated with ribavirin, DZNeP, and decitabine in various micromolar concentrations. U-CH1 and UM-Chor1 were assessed for cell growth via Cell Counting Kit 8 and proliferation assays, with cells manually counted over multiple timepoints. UM-Chor1 was also assessed for cell death (apoptosis) via flow cytometry with AnnexinV and Propidium Iodide staining. Additionally, clonogenic assays were performed in both cell lines. In proliferation assays of the U-CH1 line treated with ribavirin or DZNeP monotherapy, a visible trend of steadily lower cell count over eight days was shown. Proliferation assays of the UM-Chor1 line showed significant decreases in cell growth when treated with DZNeP, decitabine, and combination therapy over six days. Flow cytometry in U-CH1 cells demonstrated significant increase in the number of AnnexinV+ (apoptotic) cells for those treated with DZNeP, and a trend toward apoptosis in cells treated with ribavirin. Clonogenic assays showed a trend toward decrease in clonogenic potential of U-CH1 but not UM-Chor1 cells when treated with ribavirin, while decreased clonogenic potential was demonstrated in both cell lines when treated with DZNeP. In UM-Chor1 specifically, a trend towards decreased clonogenic potential was shown when treated with DZNeP, decitabine, and combination therapy. These promising preliminary results imply that these combination therapies may be a viable means for chordoma treatment, and further exploration through in vivo experiments may provide evidence pivotal for the treatment of this devastating cancer.

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CLINICAL AND TRANSLATIONAL RESEARCH

Neuroscience

Extraoral Bitter Taste Receptors in the Mammalian Liver

Bitter taste, is thought to guide organisms to avoid harmful toxins, and thus critical to survival. The sensors for bitter compounds are bitter taste receptors (TAS2Rs), a class of G protein-coupled receptors (GPCRs) originally identified in the taste bud ligand. The expression of T2Rs have been found in several extra oral systems, including the liver, brain, and GI system (Friedman 2012). This study seeks to isolate RNA from C57B/6 livers, synthesize cDNA, use TaqMan array qPCR for 10 TRs expressed in the liver, confirm the presence of Tas 2R via RT-PCR, clone full-length Tas2R into mammalian expression vector, confirm the surface expression of transfected Tas2r108 and Tas2r135. Overall we hope to determine physiological ligands for receptors for via calcium assay and elucidate function of hepatic sensory receptors. Furthermore, we will begin calcium assay to test any published ligands to detect intracellular calcium signaling. These findings raise the question of the biological function of these taste receptors, if any, in extra-oral cells. The liver is the largest metabolic organ in the body and participates in maintaining homeostasis in many ways including regulating blood composition, bile & cholesterol production, and drug metabolism. As such, the liver is primed to take advantage of these sensory receptors. In conclusion, we found that Tas2r135 and Tas2r108 have been localized in the liver and traffic to the cell surface. In addition, calcium assay studies are in process of assessing knowling ligands and in future more physiological ligands will be explored. In the future, other ligands will be explored and elucidate the function of hepatic sensory receptors.

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Cancer

Genomic Data May Affect Risk Stratification of Prostate Cancer Differentially Among African American and Caucasian Men

INTRODUCTION: In the post-USPSTF era, the decision to identify and treat prostate cancer remains controversial. The Decipher Prostate Cancer Classifier (DPCC) is a genomic test that independently predicts the risk of metastasis and prostate cancer specific mortality. This test has been proven to clinically correlate with clinicopathologic features of prostate cancer such as the Cancer of the Prostate Risk Assessment Post-Surgical Score (CAPRA-S). So far, the studies used to validate the outcomes of the DPCC have been mostly comprised of Caucasian men. Given the increased risk of prostate cancer specific mortality in African American men, we sought to identify the utility of DPCC in risk stratification, comparing discordance among clinicopathologic features and genomic data. METHODS Using an IRB-approved single institution database, we identified 168 African American and 151 Caucasian men who had undergone radical prostatectomy between December 2008 and August 2019 for whom the DPCC was retrospectively ordered. Clinicopathologic variables were then used to risk stratify the patients based on CAPRA-S risk classification systems (low, intermediate, and high risk). Comparisons were made to the DPCC risk score classification groups (low, average, and high risk). Discordance among risk classifications was then calculated. RESULTS Among both African American (chi2 = 0.026) and Caucasian men (chi2 = 0.0005), risk classifications between CAPRA-S and DPCC were significantly correlated. However, there were high rates of discordance seen between DPCC And CAPRA-S risk categories. Among African American men, DPCC implied an increased risk compared to CAPRA-S in 27% of men, compared to 43% of Caucasian men (Z score: 3.1; p = 0.0022). Conversely, Decipher score risk classifications were lower than CAPRA-S scores in only 21% of white males, compared to 34% of their black counterparts (Z score: 2.6; p = 0.0083). CONCLUSIONS In our cohort, DPCC risk groups were clinically correlated to clinicopathologic features in both African American and Caucasian men, but with a high rate of discordance. African American men were much more likely to have a lower predicted prostate cancer specific mortality on DPCC than suggested by the clinicopathologic features. Caucasian men, on the other hand, were more likely to have DPCC scores that portended an increased risk than that implied by the CAPRA-S risk category. Further research is needed to determine which patient populations merit further risk stratification with genomic tests and how to best study these populations.

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Cancer

Cold Atmospheric Plasma Induced Cell Activation in the Treatment of Glioblastoma Multiforme

INTRODUCTION: Glioblastoma multiforme (GBM) is the most common and aggressive primary central nervous system (CNS) neoplasm in adults. The current standard of care for the treatment of GBM includes a combination of radiation therapy, surgical resection, and medical management (temozolomide/TMZ at initial presentation and bevacizumab at recurrence). With a median post-diagnosis survival time of 15-16 months in patients receiving multifaceted treatment (chemotherapy, radiation, and surgery), any innovation with the potential to either independently target or synergistically improve other, currently available treatment modalities for GBM is of great interest to neuro-oncology providers and patients. Cold atmospheric plasma (CAP) is a high-energy ionized state of matter that can be applied directly as a microjet or indirectly as an injection to tissue to immediately and selectively sensitize cancer cells to chemotherapeutics. The "activation state" - maximum threshold of sensitization - can be reached within 20 seconds. De-sensitization, however, takes 5 hours. By applying an electrical field to a carrying gas, CAP is thought to exert its anti-cancer effects by generating reactive oxygen and nitrogen species that selectively damage neoplastic cells due to their pre-existing oxidative stress from high metabolic activity. In this study we demonstrate the existence of a CAP-induced activation state among human glioblastoma (U87) cells which confers increased sensitivity to TMZ as quantified via cell viability. Methods: The CAP device was designed and assembled in the Keidar lab at GW. This device used helium as the carrying gas at a flow rate of 8L/min. Electrodes were connected to a high-voltage resonant transformer (8 kV peak to peak, 12.5 Hz). Optical emission spectroscopy was used to characterize the plasma. U87 cells were cultured in DMEM supplemented by 1% penicillin/streptomycin and 10% FBS. CAP was delivered to U87 cells in a 96-well plate for 1 minute in combination with 10 µM TMZ or 50 µM TMZ in a total volume of 50 µL of media during treatment. Cell viability was measured via standard MTT assay after three days of incubation. Results: Direct treatment with CAP for 60 seconds sensitized U87 cells to treatment with TMZ at concentrations of 10 µM and 50 µM. Conclusions: Treatment of U87 cells with CAP produced an activation state that sensitized cells to treatment by TMZ. This increase in cytotoxicity from a widely used drug provides encouraging evidence to support further research and the possible clinical application of CAP as an adjunct to existing therapy for GBM.

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Surgery

Simultaneous Zygomatic Osteotomies With Reduction Mandibuloplasty: Our Approach to Mid and Lower Facial Feminization in the Transfeminine Patient

PURPOSE: Facial feminization surgery (FFS) is aimed at treating gender dysphoria associated with anthropometrically masculine facial features. When combined with appropriate hormonal therapy and body contouring, FFS is a crucial component of the gender transition process. This study describes a combined middle and lower facial feminization technique that has resulted in high patient satisfaction. METHODS: A single-surgeon, single-institutional retrospective review was performed of patients undergoing concurrent reduction mandibuloplasty and zygomatic osteotomies between August 2017 and October 2018. PROCE-DURE: Reduction mandibuloplasty was performed first, which allowed harvesting of bone graft for the zygomatic portion of the procedure. The lateral body and mandibular angle were reduced via an angle-splitting ostectomy with lateral cortex excision and gonial angle reduction. Chin reduction was performed for wide squareshaped chins via central wedge excision osseous genioplasty. Zygomatic osteotomies were performed in all cases, using previously harvested mandibular bone as a bone graft designed according to the degree of desired zygomatic augmentation. RESULTS: Ten transfeminine patients were analyzed. Two patients reported histories of prior facial surgery, and 1 patient reported history of untreated pediatric nasal fracture. Mean follow-up after surgery was 5.9 months. Patient satisfaction was high, and 6 of the patients included in this study have undergone further FFS of other facial areas since. Transient V3 hypoesthesia was noted in 4 patients. Transient marginal mandibular nerve weakness was noted in 1 patient, which resolved after 3 months. Minor mandibular contour asymmetry was noted in 1 patient, who declined revision. CONCLUSIONS: Our approach to feminization of the mid and lower thirds of the face often involves simultaneous zygomatic osteotomies with outfracturing, and reduction of themandibular angles and chin via osseous genioplasty. This approach spares morbidity of a separate bone graft donor site for zygomatic augmentation by utilizing already-harvested mandibular bone. The overall esthetic effect is tapering/softening of the lower face and enhancement of the cheekbones, resulting in feminized facial proportions. This study serves to describe our experience with the application of esthetic craniofacial techniques to the transgender population. REFERENCES: 1. Ousterhout DK. Feminization of the forehead: contour changing to improve female aesthetics. Plast Reconstr Surg. 1987;79:701-713. 2. Mommaerts MY, Abeloos JVS, De Clercq CAS, et al. The "sandwich" zygomatic osteotomy: technique, indications and clinical results. J Cranio-Maxillofacial Surg. 1995;23:12-19.

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Hematology

Catastrophic Antiphospholipid Antibody Syndrome treated with Eculizumab: Implications for Pathophysiology

Antiphospholipid antibody syndrome (APS) is an autoimmune disorder characterized by thrombosis and/or obstetrical complications associated with the presence of specific autoantibodies. Catastrophic APS (CAPS) is defined as thrombosis affecting three or more organs within one week. It requires involvement of small vessel occlusion, and can present with thrombotic microangiopathy. Treatment of CAPS typically includes anticoagulation, steroids, plasma exchange, and intravenous immunoglobulins (IVIG). Eculizumab is a terminal complement inhibitor used for treatment of atypical hemolytic uremic syndrome (aHUS), another disease that can present with thrombotic microangiopathy. Recent case studies show potential for use of eculizumab in CAPS refractory to first-line treatment. This case series examines 3 patients with definite or presumed CAPS. These three patients presented with symptoms including renal failure requiring dialysis, deep vein thrombosis, cardiac involvement, and neurological symptoms. All three patients were refractory to first-line treatment. Treatment with eculizumab improved kidney function in all three patients, with two of three patients no longer requiring dialysis. Neurological symptoms, including encephalopathy, seizures, and migraines, improved with eculizumab therapy as well. Genetic analysis revealed one patient with a homozygous missense mutation in factor 1 in one patient and another with a homozygous gain of function mutation of factor B. One patient had no known mutation associated with the complement pathway. While APS is thought to be primarily antibody mediated, the underlying mechanisms controlling CAPS are not well understood. In the aforementioned cases, the presence of complement mutations as well as the success of eculizumab therapy suggests that CAPS, at least in some manner, is complement mediated.

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CLINICAL AND TRANSLATIONAL RESEARCH

Neurosurgery

Current Utilization of Endovascular Mechanical Thrombectomy in the Treatment of Acute Ischemic Stroke

Extensive randomized control trials and meta-analyses have shown that endovascular mechanical thrombectomy (MT) is an effective treatment for acute ischemic stroke. Second generation MT devices have been associated with better functional outcomes at 90-day follow-up compared to intravenous thrombolytics alone regardless of coadministration of IV t-PA. Systematic assessment of trends in the adoption of endovascular treatment in the United States and their relationship to patient outcomes have been limited to date. To address this, we examined variation in the utilization of mechanical thrombectomy across the United States by geographical region and urban-rural areas to identify disparities in implementation. 2016 data from the Global Burden of Disease Collaborative Network were used to determine acute ischemic stroke (AIS) incidence by state. Further analysis using the 2016 National Inpatient Sample (NIS) was completed to identify patients who underwent MT and patients who were diagnosed with a cerebral infarct due to thrombosis or embolism of middle cerebral or anterior cerebral arteries, or infarct due to occlusion or stenosis of small arteries that represented the AIS population of interest using ICD-10-CM/PCS codes. NIS data were also used to create national weighted estimates of the size of subject populations, MT patient age at admission, length of stay, and discharge status. These four variables were also assessed for nine regional divisions and by population level. Our analyses found that approximately 13,010 mechanical thrombectomies were performed in 2016, representing 3.1% of the potentially eligible stroke population. The proportion of stroke patients undergoing MT varied by region and urban-rural area. Proportions were highest in large central metropolitan areas and lowest in small metro areas and rural settings when compared to the national estimate. East North Central and West South Central regions had significantly lower proportions of MT patients with 2.8% and 1.9% respectively. Average patient age did not differ significantly by region or urban-rural area; however, discharge destinations did vary by both categories. The number of MTs performed in 2016 increased approximately 1.3 times since publication of key meta-analyses in 2015. However, considering that 10% to 17% of AIS patient may be MT eligible, current rates of MT are low across all regions and urban-rural areas. The disparities in MT utilization identified in this study will be important to monitor as the adoption of endovascular stroke treatment continues to rise.

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CLINICAL AND TRANSLATIONAL RESEARCH

Infectious Disease

Assessment of Provider Awareness, Diagnosis, and Treatment Practices of Malaria

Malaria is a relatively rare but potentially deadly disease affecting ~1,500 patients in the USA each year, most of them returning travelers. Previous research suggests that low awareness of the presenting signs and symptoms of malaria among medical professionals on the community (non-academic) level, and limited access to the recommended diagnostics and medications for malaria in those settings, contribute to delayed diagnosis and higher severity of illness. This study was designed to evaluate what areas of knowledge among physicians and other front-line medical providers may be lacking, and what logistical barriers exist to timely diagnosis and treatment. This study is a brief survey to assess these areas, which will be distributed through existing email lists of medical professional societies. Study findings will be used to design medical education materials and raise awareness of malaria among practitioners, leading to improvements in the quality of medical care for patients who travel to tropical areas. The survey has been developed, and the next phase is the distribution and data analysis for this project.

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Orthopedics

Genetic Variants in FUBP3 and CTNNB1 Influence Musculoskeletal Phenotypes in Young Adults

BACKGROUND: A recent study found 15 single nucleotide polymorphisms (SNPs) associated with fracture risk and BMD in an adult population.1 Among identified loci, CTNNB1 has been associated with the Wnt/B-catenin signaling pathway, while the FUBP3 gene has been associated with BMD and bone mineral content (BMC). OBJECTIVE: The purpose of our study was to investigate genetic variation in FUBP3 (rs7851693) and CTNNB1 (rs430727) has on musculoskeletal phenotypes in young adults. METHODS: Cohorts: Assessing Inherited Markers of Metabolic Syndrome in the Young (AIMMY): healthy young Caucasian and African American adults recruited to study variants associated with metabolic syndrome. Functional Single Nucleotide Polymorphism Associated with Human Muscle Size and Strength (FAMuSS): healthy young adults in a strengthening program of their non-dominant arm. Genotyping: Applied Biosystems QuantStudio 7 Flex Real-Time PCR System and Applied Biosystems Tagman Allelic Discrimination Assays. Statistical analysis: Both cohorts were separated by race and sex before using analysis of covariance (ANCOVA) to analyze genotype-phenotype associations. RESULTS: FAMuSS: FUBP3 (rs7851693) - Females with the G allele had greater baseline bone (+ marrow) volume in both arms compared to those with CC alleles (p=0.027;p=0.017). AIMMY: FUBP3 (rs7851693) - African American females with the G allele demonstrated greater both hand and max grip strength than those without the G allele (p=0.017; p=0.022; p=0.012). CTNNB1 (rs430727) - Caucasian females with the G allele demonstrated greater height and BMI than those without the G allele (p=0.021; p=0.022). DISCUSSION: FUBP3 rs7851693 influenced total bone volume in FAMuSS females, which indicates larger but not necessarily denser bone. Variants in FUBP3 influenced measures of strength in females of the FAMuSS cohort, but only in African American females in AIMMY. These findings suggest sex and race may affect genetic influence on muscle strength, and expands our understanding of genetic variation in FUBP3 and CTNNB1 influencing musculoskeletal health.

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Rheumatology

Development of a Companion Diagnostic Test Guiding Autologous Implant Of Chondrocytes In Patients With Traumatic Joint Injuries And Degenerative Osteoarthritis

BACKGROUND: Autologous implant of chondrocytes to repair chondral lesions of different causes is an alternative to arthroplasty in the treatment of articular disease. It can prevent development of arthrosis, it lengthens joint life, stops the need for a prosthesis and helps recover physical activity. However, despite its growing clinical use results are at the moment unpredictable, being so far determined by anthropometric and pathophysiologic factors, as well as patient's co-morbidities and features of their joint lesions. Transplanted chondrocytes need to survive and activate their chondrogenic phenotype in the microenvironment of the synovial cavity where a delicate balance between pro-and anti-condrogenic factors from osteoarthritic lesions is operating. It is hypothesized that assessment of synovial fluid's molecular composition may reinforce the predictive algorithm supporting cell therapy qualification of patients with osteoarthritic (OA) lesions. Design: A pilot study to determine the molecular composition and prochondrogenic balance of the synovial fluid in patients with and without OA was developed. A multianalyte biomarker panel including IL-1B, IL-1Ra, IL-18; BMP-2, BMP-4, IL-6, IL-10, TNF-a, and TGF-ß1 was used to analyze the inflammatory balance. MMP-13, MMP-3, MMP-9 and ADAMTS-4 were also included to determine IL-1ß-dependent catabolism-related proteases. In addition, the levels of type X collagen and VEGF, which induce osteophyte formation in OA lesions under stimulating effects of HIF-2a were also studied. The expression level of a panel of chondrogenic marker genes (Runx-2, Sox-9, Col10a1 and Col2a1) in primary cultured chondrocytes given synovial fluid diluted in culture medium was also assessed. Methods: Routinely performed arthrocentesis during outpatient care in the consultation room served to obtain synovial fluid from non-OA and OA patients. A multi analytic immunoassay with algorithmic analysis was used to determine the concentration of chondrogenic, inflammatory and reparative factors in the synovial fluid of the injured joint of a cohort of patients with traumatic joint injuries and degenerative OA or without them. In addition, the expression of a panel of chondrogenic marker genes in synovial fluid-treated primary cultured chondrocytes was assessed by the quantitative real-time PCR. A multivariate analysis was used to identify biomarker combinations associated to synovial fluid samples endowed with high and low chondrogenic gene expression-stimulating activity. Results and conclusions: Preliminary results suggest the interest of analyzing the balance between pro-and anti-condrogenic factors in the synovial fluid as a companion diagnostic laboratory test of help to discriminate highly responsive from low responsive patients following autologous chondrocytes transplantation therapy.

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Cancer

Targeting p38 Isoforms to Inhibit Growth and Invasion, and to Overcome Therapy Resistance in Human Malignant Squamous Cell Carcinoma

Squamous cell carcinoma (SCC) is one of the leading causes of death with its incidence continuously rising each year. Current treatment modalities are not satisfactory due to their associated toxicities and resistance that hinder a good prognosis. The aim of this study was to delve into more efficacious therapies using a molecular approach in hopes that a superior treatment can eventually be extended to patients in clinic. We investigated the role of the stress-activated protein kinases, p38a and p38d, as potential targets for treating human skin and head and neck SCC. Our preliminary data showed that a simultaneous targeting of p38a/p38d significantly blocks proliferation, survival, and invasion in human SCC lines. Using pharmacologic and genetic approaches, we aim to: investigate the mechanisms underlying these effects in the SCC cells, determine whether p38a/p38d inhibition modulates the responses of SCC cells to common therapies, and to elucidate the mechanisms involved. Western blots using murine oral cancer1 (MOC1) cell lysates were run to examine whether the expression of the proteins p-NFkB and p-ERK1/2 changed between treatments with control, a p38a/p38ß inhibitor (SB), and a potent pan-p38 inhibitor (C62) at 24 hours, 48 hours, and 7 days. Phosphorylated (active) ERK was most upregulated in C62-treated samples for all timepoints, which was not seen for SB at any time point, while C62 downregulated p-NFkB (active) compared to control and SB at 48 hours. Using SCC12 cell viability assays, we investigated the effects of p38a and p38d pharmacologic inhibition or genetic knockdown both individually and simultaneously, in response to treatments with EGFR-inhibitor AG-1478 (AG) or Cisplatin. We found that p38a/p38d co-inhibition using 2 µM C62 + AG was synergistically cytotoxic in SCC12 cells while the combination treatments with SB and AG led to a decreased viability. SiRNA-mediated knockdown (KD) of p38d, but not p38a, augmented AG-induced cytotoxicity, compared with AG treatment alone (50 µM). Notably, a combined p38a/p38d KD also resulted in a synergistic decrease in cell viability at 50 µM AG. For the cisplatin treatment, only SiRNA-mediated p38d KD and p38a/p38d KD affected cisplatin-induced cells with a synergistic decrease in cell viability at 10 and/or 25 µM cisplatin, compared with cisplatin treatment alone. The cell viability assays should be repeated to further corroborate the results. Investigation of p38 expression between sexes is also necessary to make sure that this potential therapeutic target is equally efficacious for both males and females.

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Neurology

Mesial Temporal Activation Across Language Tasks

The purpose of this study was to determine if task-based language fMRI can be used to assess mesial temporal lobe (MTL) activation and lateralization. Language fMRI improves risk-assessment of post-surgical language outcomes in drug-resistant epilepsy patients. Past research demonstrates activation of the mesial temporal lobes, important structures for memory, during language fMRI in pediatric and adult epilepsy patients and controls. Thus, this study aimed to compare four language fMRI paradigms typically used to activate language regions of the brain, to determine if they can be used to assess MTL activation and lateralization. 54 typically developing (TD) controls ages 4-12 were assessed on individual and group levels for four language paradigms: Auditory description task (ADT), Auditory categorization (Audcat), Listening and Reading. Data was preprocessed using fM-RIprep. Subjects were excluded if they had excessive movement during their fMRI, assessed by an exclusion criteria of framewise displacement > 1.5 mm for 25% of volumes (n=6). Imaging processing and statistical analyses were conducted in SPM12. The region of interest (ROI) for bilateral hippocampi and parahippocampi (MTL) was based on the Anatomical Atlas Library in the Wake Forest PickAtlas. The amount of MTL activation was calculated via voxel count, magnitude of MTL activation was calculated via beta values, and laterization index (LI) of MTL was calculated via LI Toolbox bootstrap method (p0.20, Bilateral = 0.20 > LI > -0.20, Right = LI <-0.20. Results showed in terms of strength of MTL activation (beta values) there was a significant main effect of task (p=0.000), such that Reading task shows greatest strength of activation, followed by Listening, ADT, and Audcat. In terms of amount of MTL activation (voxel count), there was no significant main effect of task, although there was a trend (p=0.098) driven by a significant difference in Reading and Audcat, with Reading having higher overall voxel count. In terms of lateralization of activation (LI), ADT showed more left lateralization than Listening. Overall, Listening had the least lateralized MTL of the four tasks. Overall, this study preliminarily showed all four language paradigms activate the MTL, indicating the utility of using a language fMRI task to assess MTL functioning. Future studies will include patients to compare to TD controls, as well as adult populations to assess how MTL activation and lateralization change across the lifespan. Finally, future studies will correlate MTL activation with memory functioning from neurological assessment.

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CLINICAL AND TRANSLATIONAL RESEARCH

Rheumatology

Dual Trajectories of Fatigue and Disease Activity in an Inception Cohort of Adults with Systemic Lupus Erythematosus over 10 Years

BACKGROUND: Fatigue is one of the most common symptoms reported in patients living with SLE. We aim to: 1) determine if different trajectories of fatigue associate with specific latent classes of disease activity and 2) define the patient characteristics and associated factors in different latent classes. Methods: Inception cohort of adult patients from the Toronto Lupus Clinic from 1997-2018 was analyzed. Fatigue levels were measured using Fatigue Severity Scale (FSS) and disease activity using the adjusted mean Systemic Lupus Erythematosus Disease Activity Index 2000 (AMS). Dual latent class trajectory analysis, for fatigue and AMS, was performed. Univariate and multivariate logistic regression analyses assessed the association of baseline variables with class membership. Results: Among 280 inception patients, 4 dual classes (C) of fatigue and disease activity were identified: C1- lowest disease activity and second highest fatigue trajectories (27.0%); C2- second highest disease activity and highest fatigue trajectory (30.0%); C3-median disease activity and the lowest fatigue trajectory (33.0%); and C4- highest disease activity and median fatigue trajectory (10%). Conclusions: Four distinct latent classes of dual fatigue and disease activity trajectories were identified. Fatigue and disease activity follow distinct trajectories and disease activity alone cannot fully explain fatigue trajectories. Trajectories with higher FSS were associated with higher fibromyalgia and trajectories with higher AMS were associated with higher cumulative glucocorticoids use. Higher baseline SLEDAI-2K scores and glucocorticoid use were more likely associated with more fatigue while older age at SLE diagnosis were associated with less fatique.

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Infectious Disease

Increased CD8+ T Cell Infiltration of the Brain Following Toxoplasma gondii Exposure

INTRODUCTION: The objective of this study was to determine whether Toxoplasma gondii (T. gondii) infection increases brain T cell infiltrates as a potential trigger for the pathogenesis and behavioral alterations in schizophrenia. Namely, whether there would be an increase in the amount of T cells in brain tissue following infection with T. gondii and whether this differed from simple disruption of the blood brain barrier with lipopolysaccharide (LPS). Methods: A total of 11 C57BL/6 mice were divided into three groups. One group (n=2, 12 weeks old) was injected with LPS 22 hours prior to sacrifice and brain collection. Successful blood brain barrier disruption has been reported between 18-24 hours following injection with LPS.3 The second group (n=4, 7 weeks old) was orally infected with ova transgenic parasites 5 weeks prior to sacrifice and brain collection. The control group (n=5, 8-12 weeks old) was not infected with T. gondii or injected with LPS prior to sacrifice and brain collection. Brain tissue was digested, stained with antibodies to determine the amount of CD4+, CD8+, CD3+/CD45+, and CD11b+ cells, prepared for Flow Cytometry, and analyzed with FlowJo and GraphPad Prism software. Results: Oneway ANOVAs were performed to compare the percentage of CD4+, CD8+, CD3+/ CD45+, and CD11b+ cells from brain tissue between the different groups. The T. gondii infected group exhibited the highest average percentage of CD3+/CD45+ cells when compared to the LPS (p<0.0001) and control (p<0.0001) groups. The T. gondii group also exhibited the highest percentage of CD11b+ cells when compared to the control (p<0.0001) and LPS (p=0.0003) groups (Figure 1). Of the CD3+/CD45+ cells, the percentage of CD8+ and CD4+ was determined. The T. gondii group exhibited the highest percentage of CD8+ cells when compared to controls (p=0.0377) however there was no significant difference between the T. gondii and LPS groups or the control group and the LPS group. The control group exhibited the highest percentage of CD4+ cells when compared to the T. gondii group (p=0.0080) and the LPS group (p=0.0035) (Figure 2). Conclusion: Compared to LPS and control groups, T. gondii infected mice exhibited the highest percentage of CD3+/CD45+ and CD11b+ cells. Additionally, when compared to the control group, the T. gondii group exhibited a higher percentage of CD8+ cells, which suggests that T. gondii infection enhances CD8+ T cell infiltration and may lead to enhanced T cell exhaustion and the associated neurobiological and behavioral abnormalities in schizophrenia.

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Orthopedics

Development of a Customized 3D-printed Cast for Treatment of Minimally Displaced Distal Radius Fractures in Pediatric Patients

BACKGROUND: Distal radius fractures are the most common long bone fracture in the pediatric population and frequently require casting for treatment. Traditional casts are heavy, bulky, susceptible to water damage, and frequently lead to cutaneous and neurovascular complications. The incidence of cast-related skin complications is approximated to be 13.6 per 1000 patients. Current 3D laser scanning and printing technology enables physicians to take 3D images of a limb and create a customized, biocompatible cast that is lightweight, thin, waterproof. Chen et al. have shown that 3D-printed casts of distal radius fractures have comparable clinical effectiveness compared to plaster casts. Here, we have developed a customized, biocompatible 3D-printed cast that can be used for treatment of a minimally displaced distal radius fractures in pediatric patients. Methods: The forearm of a sample patient was scanned using the handheld Artec Eva Lite 3D scanner. The 3D image was uploaded into Geomagic and used to create a 2-piece hollow-shell cast with computer assisted design (CAD). The files were then sent to Xometry®, a 3D-printing company, to be printed using MED610 biocompatible material (a durable polymer-based material approved by the FDA for prolonged skin contact). The cast was designed in two pieces to allow for easy placement on the forearm. Zip ties were used to enclose the cast around the forearm circumferentially. Holes were intentionally printed in the design to allow for facile evaporation of water and sweat. Results: A 3D-printed cast (Figure 1, Figure 2) was printed on MED610 biocompatible material according to our specifications obtained from the Artec® Eva Lite 3D scanner. The thickness of the cast was 5 mm. The cast was offset from the skin of our sample patient by 1.75mm to allow for expected post-traumatic tissue edema and prevent compartment syndrome. Our sample patient wore this cast for 2 days (removed for showering and sleeping) and did not have any cutaneous or neurovascular complications. Conclusions In this work, we successfully developed a customized, biocompatible 3D-printed forearm cast with the potential to treat minimally displaced radius fractures in orthopedic pediatric patients. Our future research will assess the clinical effectiveness and rate of cutaneous and neurovascular complications with the use of the cast compared to traditional casts in children aged 5 to 12 with minimally displaced radius fractures. These studies will provide a foundation for clinical trials to test the effectiveness of our 3D-printed casts in treating injuries requiring prolonged immobilization.

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CLINICAL AND TRANSLATIONAL RESEARCH

Emergency Medicine

Do Initial Tidal Volumes Matter in the Setting of the Emergency Department?

LEARNING OBJECTIVES: Mechanical ventilation is a lifesaving therapy however, it may pose a threat to patients if set inappropriately. Prior studies suggest that tidal volumes (TVs) based on ideal body weight (IBW) are associated with improved outcomes for intubated patients. We sought to determine whether TV settings based on IBW correlated with clinically relevant patient outcomes for patients intubated in the emergency department (ED). Methods: We performed a retrospective review of electronic medical records from January 2016 to December 2018 for intubated patients in the ED. We collected data including: patient demographics, height, weight, lab values, and ventilator settings in the ED. We calculated IBW for all patients to determine the tidal volume per kilogram given in the ED. We stratified the TVs based on low (10cc/kg). We assessed the impact of TV on the following outcomes: ventilator days, intensive care unit (ICU) days, hospital days, and death. Multivariable logistic and general linear models were assessed adjusting for baseline demographics, clinical variables, and illness severity to better elucidate the independent effect of tidal volume on outcomes of interest. Length of stay (LOS) outcomes were natural logarithm (In) transformed to meet the assumptions of normality and linear regression. Results: 217 patients had full data record for analysis. Average age was 59.7 ± 15.4 years old (mean ± standard deviation). 90 (41.5%) patients were female and 127 (58.5%) were male. Median SOFA score was 8 with interquartile range 6 to 11. Median LOS for days on ventilator, days in ICU, and days in hospital were 3, 5, and 8, respectively. 64 (29.5%) patients experienced mortality. Adjusted analysis detected no independently significant relationship between any of the IBW ED tidal volume per kg and mortality, ICU days, or hospital days (Table). Conclusions: This data suggests that the TV size did not significantly affect patient outcomes. There was no association between low, intermediate or high TV and mortality, ventilator days or hospital days.

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Mental Health

The Role of Relationships in Sleep Quantity and Quality during Pregnancy

INTRODUCTION: Although sleep quality and quantity may often be considered individual-level factors, there are many interpersonal factors that affect these sleep characteristics. One important factor is relationship quality, both in terms of the relationship amongst married individuals who may share a bed, and the affective effect of this perceived relationship quality (e.g., loneliness). Particularly in pregnancy, evidence demonstrates that relationships with partners play a role in both emotional distress and in biological factors such as levels of inflammation, which can impact sleep quantity and quality. This study seeks to examine the role of relationship quality on sleep onset and duration in pregnant women. Methods: In a prepartum survey, 27 women in their first pregnancy (M = 30.2 gestational weeks, SD = 3.1) with no reported history of psychiatric or sleep diagnoses completed measures of sleep quantity and quality, mental health, and relationship quality. Sleep latency was measured via two mechanisms: sleep latency in the past week (average number of minutes to fall asleep in the past week) and sleep latency in the past month (Pittsburgh Sleep Quality Index [PSQI] Question 2: number of minutes to fall asleep in the past month). Additionally, the PSQI queried total sleep time. Relationship/marital quality was measured using the Dyadic Adjustment Scale (DAS). Mothers also reported their subjective feelings of loneliness and isolation via the UCLA Loneliness Scale. Partial correlations were run on the relationship between sleep parameters and interpersonal factors, controlling for gestational week and maternal age. Results: Women who reported better marriage quality also reported both shorter sleep onset latency in the past week, and in the past month (r=-0.52, p=0.07; r=-0.48, p=0.01). Additionally, increased levels of loneliness were associated with decreased total sleep duration (r=-0.48, p<.05). Conclusions: Overall, sleep quantity, as measured by both latency and total time of sleep, are impacted by perceived relationship quality and loneliness. As such, when providing sleep interventions in pregnancy, interpersonal factors are important to consider. As sleep is fundamental in pregnancy, and deficiencies increase the risk of negative outcomes for both the mother and child, this could have significant implications for differences in sleep postpartum.

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Genomics

Pharmacogenetics of Ondansetron Failure in Pediatric Chemotherapy-Induced Nausea and Vomiting

Polymorphisms of certain genes influence individual responses to medications. Identifying these polymorphisms for ondansetron, an anti-emetic medication, can help predict which patients are at risk for refractory nausea and vomiting so that therapy can be modified accordingly. This has the potential to improve clinical outcomes, reduce complications, and lower treatment cost. Previous studies have suggested a correlation between ondansetron failure and specific polymorphisms associated with altered metabolism and transportation of this medication (CYP2D6, ABCB1, 5-HT3RB). This study aimed to evaluate these correlations and build a predictive model of ondansetron failure. The participants of this study were pediatric oncology patients at the Center for Cancer and Blood Disorders at Children's National Medical Center taking ondansetron for chemotherapy-induced nausea and vomiting. Our volunteer sample included 93 patients aged 0-33 years. Patients with a history of bone marrow transplant were excluded from this study, because their peripheral blood samples would not represent germline genetic information. All included patient charts were reviewed retrospectively for 4 chemotherapy cycles. Outcomes measured were ondansetron failure, defined as persistent nausea or vomiting despite administration of ondansetron, with the need to switch to another anti-emetic (granisetron) around-the-clock, or the need to add three or more antiemetics in addition to ondansetron. DMET chips (Affymetrix) assessed single nucleotide polymorphisms (SNPs) in 230 genes associated with drug metabolism, including our genes of interest. The study is still ongoing, but preliminary data has associated the following two combination of SNPs with ondansetron failure: 1) no AAG deletion at position 113904832 on the 5-HT3B gene (rs45460698), AA or GA at position 113904553 on the 5-HT3B gene (rs3758987), and TT, TA or GA at position 87531302 on the ABCB1 gene (rs2032582); or 2) any deletion at position 113904832 of the 5-HT3B gene (rs45460698) and TT or TC at position 87509329 on the ABCB1 gene (rs1045642). These predictive models are statistically significant (p<0.001) and predict ondansetron failure with an odds ratio of 13.18. This model is not sensitive (46%) but quite specific (93.4%). Neither CYP2D6 nor sex were found to be significant, but African American race and patient age may have an impact. Our preliminary data has correlated specific polymorphism combinations in the 5-HT3B and ABCB1 genes with ondansetron failure. Based on this predictive model, patients fitting the above criteria should consider using anti-emetics other than ondansetron due to high risk of refractory nausea and vomiting, although a larger sample size will help confirm these correlations.

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Cancer

Functional Characterization of Next Generation Histone Deacetylase 6 Inhibitors

Immune checkpoint blockade (ICB) has shown outstanding clinical success in the treatment of melanoma; however, a significant proportion of patients develop resistance or do not respond to ICB. New focus has been placed on improving the efficacy of ICB through the inclusion of histone deacetylase 6 inhibitors (HDAC6is). HDAC6is have demonstrated anti-tumor cytotoxic function, but recently have been shown to serve non-canonical role as modulators of immune-regulated signaling pathways. Highly selective HDAC6is, including Nexturastat A (Next A), are able to heighten tumor immunogenicity and immune surveillance, making them ideal compounds for the potentiation of immunotherapeutic agents. This study characterizes the functional and immunomodulatory properties of three next-generation HDAC6is in comparison to Next A, as well as demonstrates anti-tumor activity utilizing syngeneic melanoma models. Three next-generation HDAC6is (SS-5-54, SS-5-55, SS-5-56), were utilizing syngeneic melanoma models. Three next-generation HDAC6is (SS-5-54, SS-5-55, SS-5-56), were compared to Next A at varying concentrations over 24 hours in vitro using murine melanoma SM1 cells. Potency and cytotoxicity were quantified through HDAC-Glo™ I/II and CellTox™ Green Cytotoxicity assays, respectively. Immunoblotting was used to assess specificity with acetylated tubulin as a positive readout and acetylated histone 3 as a negative-unspecific readout. Inhibitors were further evaluated for anti-tumoral activity and immunomodulatory effects in vivo using SM1 tumor-bearing C57BL/6 mice challenged with HDAC6i, anti-PD1, and combination therapy. Tumors were observed over 2 weeks and analyzed through flow cytometry. SS-5-55 best demonstrated characteristics of an ideal HDAC6 inhibitor with selectivity comparable to Next A. SS-5-55 exhibited significant potency at low concentrations (2.5 - 5 µM), while maintaining low cytotoxicity above 10 µM. Immunoblot densitometric analysis revealed increased acetylation of alpha-tubulin in a dose-dependent fashion, but not acetylation of Histone 3 - consistent with a non-canonical, immunomodulatory function. SS-5-55 demonstrated a 14.1-fold increase in acetyl-alpha-tubulin at 10 μM compared to 7.2 with Next A. Tumor-bearing mice treated with a combination of anti-PD1 and SS-5-55 showed reduction in tumor volume compared to individual therapies alone (p<0.05). Combination therapy also demonstrated significant increase in tumor microenvironment-infiltrating cytotoxic T-cell and natural killer T-cell composition, as well as cytotoxic T-cell effector memory. Furthermore, combination therapy and SS-5-55 therapy alone demonstrated a significant increase in M1/M2 macrophage phenotype ratio; pro-tumorigenic M2 macrophages were significantly reduced, while pro-inflammatory M1 macrophages persisted. Our results support the characterization of SS-5-55 as a minimally cytotoxic, selective HDAC6i that functions as an immunological priming agent capable of potentiating anti-PD1 immunotherapies. Further studies are needed to elucidate the compound's specific mechanism of action.

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Integrative Medicine

Adjunctive Mindfulness Intervention for Adolescents with Obesity: A Systematic Review and Single Arm Pilot Study

BACKGROUND. Obesity in adolescence is predictive of obesity in adulthood and risk for chronic disease. Traditional behavioral approaches to addressing obesity in adolescence rarely yield meaningful changes in body mass index (BMI), suggesting that adjunctive treatments are necessary. Mindfulness, or present moment awareness, is a practice that can be used to interrupt mindless patterns of behavior that increase risk for obesity, such as overeating. The goal of this study was twofold: 1) to examine the feasibility and efficacy of mindfulness-based interventions (MBIs) in adolescent populations with obesity through a systematic review and 2) to conduct a study examining whether it is feasible to integrate a brief mindfulness intervention with the usual recommended care for adolescent obesity in a pediatric weight management clinic. Methods. 1) A literature search across two databases yielded 7 articles for inclusion. Members of the research team coded each article according to study design, sample and intervention characteristics, outcomes examined, significant results, and drop-out rate. 2) We conducted a single arm open-label trial with 11 adolescent patients with obesity. Participants received the recommended standard of medical management of obesity (usual care) plus a six-week mindfulness intervention. To assess the primary aim of feasibility, recruitment, retention, and satisfaction rates were examined. Participants also completed measures of mindfulness, emotion regulation, disordered eating, quality of life, executive functioning, and had their BMI and blood pressure measured. Results. 1) In general, the results across studies were encouraging. Adolescent participants of an MBI generally demonstrated decreases in obesity-related behaviors, such as binge eating and emotional eating. Weight loss throughout the studies was modest, if present at all, suggesting that these interventions should be used alongside other lifestyle modifications for optimal results. 2) 11 adolescents were recruited to participate in the intervention, with 8 (73%) completing the entire program. Attendance rates (85%) and satisfaction rates (88%) were promising for a larger trial. While preliminary analyses of changes in health outcomes should be examined with caution, effect sizes ranged from small to large with some promising trends in eating behaviors. Discussion. Initial results indicate that MBIs may be a useful tool in the prevention and treatment of adolescent obesity. It might be feasible to augment existing behavioral interventions for adolescents with obesity with brief mindfulness; however, some adaptations are needed to enhance recruitment and retention. The lessons learned in this feasibility study can inform an adequately powered efficacy trial.

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Mental Health

Associations Among Insurance Type, Depressive Symptoms, and Glycemic Control in Youth with Type 1 Diabetes

BACKGROUND: Depressive symptoms are associated with elevated A1c levels in adolescents and young adults (AYAs) with type 1 diabetes (T1D). Insurance type may influence the relationship between depressive symptoms and glycemic control (A1c) and impact engagement in mental health treatment. Objectives: Evaluate associations among insurance type, A1c, and depressive symptoms and evaluate if insurance type impacts engagement in mental health treatment. Methods: AYAs with T1D presenting for routine clinical diabetes care were administered the Patient Health Questionnaire-9 (PHQ-9) (n=763; Mage=16.6 years ± 2.3; 52% male; 53% non-Hispanic White; 69% with private insurance). Demographic information and A1c values (M A1c= $9.3\% \pm 2.1$) were taken from the medical chart. Results: PHQ-9 scores ranged from 0-27 (M PHQ-9 = 3.9 ± 4.9); 10.1% of patients reported moderate (8.9%) or severe (1.2%) depressive symptoms. Patients with private insurance (M = $8.74\% \pm 1.9$) had lower A1c values than patients with public insurance (M = $10.44\% \pm 2.3$; p< .01). At the next visit after elevated depressive symptoms were identified, 42% of patients reported receiving mental health treatment, and patients with private insurance remained more likely to be in treatment (?2 (106) = 3.83, p = .05). Conclusion: Insurance type is associated with depressive symptoms and glycemic control in AYAs with T1D. Results suggest engagement in mental health treatment varies by insurance type such that patients with public insurance are less likely to be in treatment, even when depressive symptoms are identified in routine diabetes care. Knowing which patients are at an elevated risk for depression allows clinicians to intervene earlier in clinical progression.

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Imaging

A Polymer Gel Index-Matched to Water Enables Cell Growth and High Resolution Imaging in Fluorescence Microscopy

High resolution fluorescence microscopy has long contributed to advancements in biological research. Several known materials including hydrogels and microfluidic devices possess properties that are well-suited for long-term imaging applications. However, the high refractive index (n ~= 1.41) of polydimethoxylsilane (PDMS), a silicone polymer used frequently in microfluidic devices, causes significant optical aberrations due to the RI mismatch that occurs at the interface between the polymer and the aqueous sample which has a RI of n = 1.33. These aberrations severely degrade image focus, resolution, and signal, reducing the information content of the resulting data. Compared to other commonly used polymers, hydrogels can offer a lower RI (n ~=1.37 - 1.41) depending on thickness and polymerization conditions. Although the RI of these hydrogel materials are better matched to living samples, even a small mismatch in RI causes a noticeable deterioration in image quality. In this study researchers hypothesized that diffraction-limited imaging is possible through BIO-133, a commercially available non-toxic, non-fluorescent, UV-curable polymer with the same refractive index as water. Human bone osteosarcoma epithelial cells (U2OS line) were seeded directly on a 50 micron thickness fully-cured BIO133 membrane. After such preparation, cells seeded on BIO-133 adhered and grew with similar morphology and growth rate as cells adhered on glass coverslips. Additionally, to demonstrate that transfected cells seeded directly on BIO-133 could be imaged at high spatiotemporal resolution, U2OS cells expressing fluorescent markers were seeded onto a 50 micron thickness BIO133 membrane and imaged using diSPIM. The jointly registered and deconvolved data acquired from two views displayed isotropic spatial resolution allowing researchers to clearly visualize individual mitochondria and their dynamics. Through these experiments researchers demonstrated that BIO-133 outperforms other materials in terms of its optical performance likely due to minimal RI mismatch at the interface between the polymer and the specimen. This novel fluoropolymer provides an inert and biocompatible scaffold on which to grow and image tissue culture cells and could allow researchers to achieve higher resolution images.

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Cancer

Primary Rectal Hodgkin's Lymphoma in an HIV + Transgender Patient: A Case Report

A 33-year-old transgender female presented with recurrent melena, dizziness, and fatigue and was found to have a large rectal mass 20cm from the anal verge. An EUS guided fine needle aspiration of this lesion revealed classical Hodgkin's Lymphoma. The location and dim immunohistochemical findings are atypical for this lesion. This case underlies the importance of considering extradnodal Hodgkin's disease in immunocompromised patient?s presenting with GI complaints in the setting of an indeterminate GI lesion. Furthermore, this case also demonstrates the significance of physicians and diagnosticians considering rarer pathology in both immunocompromised and transgender patients. The transgender community is among the most underserved groups in our society, including the clinical setting, and subsequently often suffers from stigmatization as well as lack of standardization of medical laboratory values and guidelines for cancer screening. Despite a relatively high prevalence of known risk factors for cancer and underscreening including smoking, poverty, and high-risk sexual behavior, few guidelines exist regarding routine screening in this population and studies examining cancer screening rates are rare. In summary, we have reported a case of rare pathology in an HIV+ transgender patient underlying the importance for a higher index of suspicion of rare pathology in at-risk patient populations.

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CLINICAL AND TRANSLATIONAL RESEARCH

Emergency Medicine

How Well Do Emergency Medicine Providers Manage Initial Ventilator Settings?

Emergency Medicine (EM) providers are responsible for choosing initial ventilator settings for newly intubated patients in the emergency department (ED) with very little information. It is unclear how often these initial ventilator settings are adjusted by intensive care unit (ICU) providers. We sought to examine whether the initial ED ventilator setting differed from those upon admission to the ICU. Patient outcomes (ICU days, ventilator days, hospital days, and death) were assessed to observe the effect of changing the ventilator settings. We conducted a retrospective study from January 2016 to December 2018 of intubated patients in the ED. We extracted patient demographics, lab values, height, weight, and ventilator settings in both the ED and ICU. We calculated ideal body weight (IBW) for all patients to determine the tidal volume (TV) per kilogram given in the ED and ICU. We recorded several outcomes including: ventilator days, ICU days, hospital days, and death. Spearman's correlation coefficient, rho, was used to identify the monotonic correlation between ventilator modification and outcomes of interest. Ventilator settings were not changed for 127 of 217 patients (58.5%) between the ED and the ICU. In the 90 patients whose settings were modified, 33 (36.7%) TV were lowered when transferred to the ICU. Of the 33 patients who had their TV decreased, only 8 patients crossed the 8 mL/kg threshold considered a standard TV. The TV delivered to the other 57 patients (63.3%) was increased by ICU providers. Of these 57 patients, 15 had the TV cross above the 8 mL/kg threshold. Monotonic correlations via Spearman's rho showed no significant effect of the magnitude of TV modification on mortality (rho=0.0543, P=0.4261), days on ventilator (rho=0.0202, P=0.7679), days in ICU (rho=-0.0327, P=0.6315), or days in hospital (rho=-0.0817, P=0.2305). Admitting ICU providers changed the ventilator settings of less than half of intubated patients in the ED, suggesting that most of the time, the initial ventilator settings set by EM providers are deemed appropriate by ICU providers. When observing the relationship between the TV modifications and patient outcomes, no adjustment of TV positively affected patient outcomes.

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CLINICAL AND TRANSLATIONAL RESEARCH

Emergency Medicine

Factors Associated with Emergency Department Length of Stay in Patients with Acute Gout

Emergency department (ED) visits for acute gout have increased by approximately 20% between 2006 and 2014. Reducing the ED length of stay (LOS) can help reduce cost of care for gout patients and ED crowding. We assessed the ED LOS and factors associated with it in patients with acute gout. A retrospective analysis was conducted and included the first ED visit of adult patients with acute gout who presented to the 3 EDs affiliated with Lifespan Health Systems, the largest healthcare provider in Rhode Island. The ED LOS was the time spent by patient in the ED until they were discharged. Patients presenting to the ED and subsequently admitted to the hospital were excluded given the differential effect of system factors in these patients. Both patient factors, such as clinical presentation of gout, as well as systems factors were assessed. Univariate and multivariable analysis were completed. The univariate analysis demonstrated that older age (> 65 years), comorbidities (hypertension, congestive heart failure) and worse ED severity score among patient factors and being treated in academic setting among systems factors were associated with being in the upper quartile of ED LOS. A multivariable analysis showed that persons of age greater than 65 years and a worse acuity score continued to be associated with longer ED LOS. Overall, the study demonstrated patients with acute gout spent a longer time in the ED than the national median of 120-150 minutes. Older age and a higher acuity score in addition to procedural delays led to longer length of stay in the ED.

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Obstetrics and Gynecology

Impact of Intrapartum Oxytocin Use in Nulliparous Women on Second Stage and Delivery Outcomes

OBJECTIVE: To evaluate whether administration of intrapartum oxytocin in nulliparous women during second stage of labor affects the length of second stage and maternal/neonatal outcomes. Study Design: We performed a retrospective cohort study of term, nulliparous women with singleton gestations, cephalic presentation, epidural anesthesia, in labor, who reached 10cm. Exclusion criteria: intrauterine fetal demise, planned cesarean delivery, suspected major fetal anomaly. Primary outcome: incidence of vaginal delivery (VD). Results were adjusted for confounders. Maternal and neonatal outcomes were compared secondarily. [IRB approval: obtained] Results: In total, 492 women were evaluated. 303 women were administered oxytocin, while 189 women were not. Demographics differed between groups by maternal age, ethnicity, hypertensive disorders, BMI, gestational age at delivery, and induction status. After adjusting for confounders, women who received oxytocin had a lower rate of VD compared to women not receiving oxytocin (VD: 88.1% vs. 94.7%; aOR 0.41, 95% CI 0.20-0.86). Women administered oxytocin had a higher incidence of prolonged second stage compared to women without oxytocin, (48.2% vs. 32.8%; aOR 1.55, 95% CI 1.04-2.32). Women administered oxytocin had a higher rate of postpartum hemorrhage of 14.4% compared to 6.4% of women without oxytocin administration (aOR 2.24, 95% CI 1.24-4.02). Neonatal complication rates were not different between groups. Conclusion: In nulliparous term women with singleton gestations and epidural anesthesia who reached 10 centimeters, intrapartum oxytocin administration resulted in a 59% decrease in VD, a 45% increase in prolonged second stage and a 125% increase in postpartum hemorrhage compared to women without oxytocin administration without a change in neonatal outcomes.

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Surgery

Comparison of Oncologic Outcomes for Robotic vs. Open Radical Cystectomy Among Locally Advanced and Node-Positive Patients: An Analysis of the National Cancer Database

INTRODUCTION: The utilization of the robotic approach for radical cystectomy for bladder cancer is increasing, despite recent concerns of atypical recurrence in the setting of pneumoperitoneum-induced immunomodulation, tumor cell intravasation, and port-site trauma. These putative mechanisms are especially relevant higher stage, locally advanced or node-positive disease, where the intrinsic metastatic potential of tumor cells may be greater. This study aims to compare the oncologic efficacy of robotic-assisted radical cystectomy (RARC) compared to the more conventional, open radical cystectomy (ORC), among patients with stage pT3-4 or node-positive bladder cancer. Methods A retrospective cohort analysis of pT3-4N0-3 or pT(any)-4N1-3 patients who underwent RARC or ORC from 2010-2016 was performed using the National Cancer Database (NCDB). Baseline demographic and clinicopathologic variables were compared between treatment cohorts. Primary outcome of overall survival was analyzed by way of Kaplan-Meier estimation with corresponding Log-Rank test, followed by multivariable Cox-Proportional Hazards regression. Secondary outcomes including 30-day mortality, 90-day mortality, 30-day readmission, positive margin status, receipt of adjuvant radiation or chemotherapy, and surgical inpatient length of stay (LOS) were analyzed by way of Chi-square, Fisher's exact, or Mann-Whitney U test, followed by multivariable logistic or transformed linear regression. Results 9,062 ORC cases and 2,544 RARC cases met inclusion criteria. Kaplan Meier estimation demonstrated RARC was significantly associated with better unadjusted survival compared to ORC (P=0.001). After adjusting for confounding covariates, multivariable Cox-Proportional Hazards regression showed no significant difference in mortality hazard between treatment approaches (P=0.324). At the univariable level, RARC was significantly associated with lower proportions of 30-day mortality, 90-day mortality, positive margin status, and shorter surgical inpatient LOS (all respective P<0.05). However, after adjusting for confounding covariates, multivariable analysis detected no statistically significant differences in outcomes of interest by treatment approach with the exception of increased incidence of >14 lymph nodes removed (55% vs. 40%, p <0.0001) and shorter surgical inpatient LOS for RARC. Conclusions RARC is no less safe than ORC for patients with locally advanced or node-positive bladder cancer on the basis of overall, 30- and 90-day survival outcomes. Unadjusted mortality and surgical outcomes in this population even demonstrate some advantages to the robotic approach. The perioperative benefits, such as the shortened hospital stay, may be greater in RARC, but further randomized control trials are necessary to fully elucidate the differences between RARC and ORC in this specific patient population.

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CLINICAL AND TRANSLATIONAL RESEARCH

Infectious Disease

Differential Phenotypic Expression of Septic Shock in the Pediatric Population

Septic shock is a common condition characterized by host immunodysregulation secondary to an infectious etiology leading to hypotension and lactic acidosis secondary to organ breakdown. Recent investigations suggest that this dysregulation is biphasic, being initially a hyperimmune reaction resulting in systematic inflammation followed by long term immunosuppression. Classically, and more commonly in adults, sepsis presents with decreased systemic vascular resistance (SVR) and warm extremities due to systematic endothelial disruption (warm shock), while pediatric cases tend to exhibit increased SVR and cold extremities (cold shock). However, in pediatric populations with still maturing immune systems, the phenotype of septic shock is much less understood. The purpose of this study was to evaluate different phenotypes of septic shock in a selected pediatric population. To do this, we created a case-control study in which we followed the hospital courses of sixteen pediatric patients hospitalized at the Children's National Medical Center between 02/2018 and 07/2019, eight of whom were admitted for septic shock and eight of whom were admitted for another, non-inflammatory condition to serve as a control. The study patients were then further subdivided by age and key metrics. We observed that patients aged less than 12 years exhibited a septic shock phenotype distinct from patients over the age of 12. Patients with septic shock above the age of 12 had higher heart rates compared to control, while patients younger than 12 did not significantly from control. Furthermore, we found that mean arterial pressure (MAP) was significantly lower in children with septic shock older than 12 compared to their younger counterparts. These findings could be due to fundamental differences in the physiology of children as compared to adults, such as the inability of children to modulate their cardiac contractility in the same manner as adults. This, in turn, is complicated by the decreased cardiac function commonly seen in pediatric septic shock. As such, in order to further unravel the fundamental basis of these phenotypes, future work will be focused on the extraction and isolation of peripheral blood mononuclear cells from each of the patients present here with the end goal of examining and characterizing the immunometabolic status of each of these patients. We hope that such an approach will help illuminate the fundamental principles underlying such observations, which in turn may prove crucial to developing novel methodologies for the treatment of sepsis.

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Surgery

Predictors of Re-Excision and Positive Margins after Lumpectomy

BACKGROUND/OBJECTIVE: Re-excision surgery to obtain negative margins is a persistent challenge following partial mastectomy, and is associated with increased rates of local tumor recurrence, poor cosmetic outcomes, delayed adjuvant therapy, and more frequent wound complications. The purpose of our study is to determine preoperative risk factors associated with re-excision for patients after partial mastectomy. Methods: A retrospective review was performed from July 2015 through April 2019 at a single institution breast care center identifying adult patients who underwent partial mastectomy for a new diagnosis of invasive breast cancer (IDC) or ductal carcinoma in situ (DCIS). Patients with a history of neoadjuvant chemotherapy, radiation therapy, or previous breast surgery were excluded. Univariate analysis was used to identify patient and tumor variables associated with re-excision as the primary outcome. Multivariable logistic regression analysis was performed to identify independent factors associated with re-excision. Results: 300 patients met inclusion criteria. 264 (88%) of whom underwent radioactive seed localization of their tumors, 32 (10.7%) had palpable lesions, and 4 (1.3%) underwent wire localization. Of the 300 patients, 116 required re-excision for positive margins (38.7%). On univariate analysis, the presence of DCIS, HER2 positivity, larger tumor size, and higher tumor grade were significantly associated with higher rates of re-excision (p<0.05). On multivariable analysis, patients who had a final pathology consistent with DCIS had an 8.5 times higher odds of re-excision (95% CI: 2.4-29.9; p<0.01) and those with IDC and DCIS on final pathology had a 4.9 times higher odds of re-excision (95% CI: 1.6-15.1; p<0.01) compared to those with only IDC. Conclusions: Patients with DCIS with or without IDC on final pathology are more likely to require re-excision for positive margins following partial mastectomy. Other patient characteristics, such as smoking, obesity, dense breasts and tumor characteristics, such as grade, stage, size, and tumor markers, were not significantly associated with an increased risk for re-excision. These findings suggest that for patients with DCIS and DCIS with IDC, additional shave margins should be considered at the time of initial surgery to prevent the need for further re-excision.

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Orthopedics

Bone Morphogenic Proteins for Upper Extremity Fractures:A Systematic Review

PURPOSE: This systematic literature review investigates success, time to healing, adverse events (AEs), and cost-effectiveness of BMP-7 and BMP-2 growth factors in treating upper extremity fractures. Methods: Literature review was performed according to PRISMA guidelines. Included publications described BMP-7 and/or BMP-2 treatment course, success, and AEs in upper extremity fractures. Treatment success was categorized as radiological union, defined as evidence of callus formation or new bone bridging on radiographs, or clinical union, defined as absence of pain with activity and functional recovery. AEs were divided into perioperative (soft tissue reaction, early implant failure) and postoperative (heterotopic ossification, neuromuscular symptoms, tissue infection, late hardware failure, delayed healing). Patient demographics, fracture patterns, healing patterns, and AE data were collected and analyzed. Results: Literature search identified 479 studies, of which 89 full-text articles were assessed. Fractures treated with BMP-7 (n=302; 692 patients) were distributed 64% humerus, 22% forearm, 11% clavicle, and 3% scaphoid, while those treated with BMP-2 (n=96; 293 patients) were distributed 58% humerus, 27% hand, 14% forearm, and 1% clavicle. BMP-7 fracture sites achieved clinical and radiological success at varying rates: 95% of scaphoid fractures (CI=55-99%), 74% of humerus fractures (CI=46-90%, Q<0.001), 29% of forearm fractures (CI=7.8-65%, Q<0.001), and 6.2% of clavicle fractures (CI=1.5-23%, Q=0.0111) achieved clinical and radiographic union in an average of 232 days (CI=96-369, Q<0.001). Humerus and hand fractures treated with BMP-2 had more similar rates of success: 75% of humerus fractures (CI=11 - 99) and 71% of hand fractures (CI=41-90%, Q=0.2593) achieved success at similar proportions (p<0.001). AEs occurred in 18% (CI=7.6-36%, Q<0.001) and 57% (CI=25-84%, Q=0.322) of fractures treated with BMP-7 and BMP-2 respectively, with 12% (CI=4.7-28%, Q=0.1037) and 29% (CI=9.7-60%, Q=0.133) undergoing AE-related procedures. Success in treating humerus and hand fractures was statistically similar between BMP-7 and BMP-2, and postoperative complications occurred at statistically similar proportions. BMP-7 was associated with longer time to radiographic union compared to BMP-2 [196 (CI=176-220) and 117 (CI=170-223), respectively; p<0.011]. Conclusions: Systematic review demonstrates varying treatment success between fracture sites in both BMPs, shorter times to healing in patients treated with BMP-7, and similar complication rates with BMP-7 versus variable rates with BMP-2. More investigation is needed to determine whether the expense of BMPs is cost-effective, especially in reducing lost work time and decreasing hospital stays. These findings contribute to understanding the application of BMP growth factors in upper extremities and identifying gaps in existing literature.

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CLINICAL AND TRANSLATIONAL RESEARCH

Otolaryngology

Laryngeal Manifestations of Crohn's Disease in a Toddler

OBJECTIVES: We report obstructing laryngeal manifestations of Crohn's disease in a toddler who required tracheotomy tube placement for relief of recalcitrant airway obstruction and to review the literature for the frequency of extra-intestinal laryngeal manifestations of Crohn's disease. Methods: Chart review of case report and literature review of reports of laryngeal manifestations of Crohn's disease. Results: 14 cases of laryngeal involvement of Crohn's disease exist in the medical literature including this case report. Most cases appear in adults, with the supraglottis most commonly affected. This case marks the youngest report and the second patient to require a tracheotomy for treatment of supraglottic obstruction when intensive medical management, including use of steroids and biologics, failed to relieve the laryngeal inflammation. Conclusions: Laryngeal manifestations of Crohn's disease are rare and usually affect adults. Most cases are managed with medical therapy, however surgical excision of obstructing lesions or tracheotomy placement is sometimes required for relief of airway obstruction.

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Integrative Medicine

"Being Healthy and Living Life as if I Never Had Cancer": The Meaning of "Living Well" from Adolescents with Cancer

BACKGROUND/RATIONALE: Extensive resources are devoted to discovering novel cancer treatments. Meanwhile, patient priorities and experiences must also be addressed. Specifically, among adolescents with cancer, patients' definitions of "living well" may elucidate treatment preferences, guide care teams and families, and influence future behavioral interventions. Objective: To develop an empirical definition of "living well" for adolescents with cancer to enhance shared decision-making. Design/Methods: Video recordings were analyzed from the Next Steps: Respecting Choices interviews with n=30 adolescents ages 14-21 years with cancer and their families, a subsample of N=126 adolescent/family dyads participating in a randomized clinical trial, FAmily CEntered (FACE) Advance Care Planning. Interviews were transcribed, verified and anonymized. A phenomenological analytic method was used to identify psychological meaning in participants' statements. Results: Adolescents with cancer conceptualize living well as meaning maintaining physical, mental and emotional health, while engaging in purposeful, typical, adolescent-appropriate activities with people important to the adolescents. This has four components: living mindfully; living an identity as a healthy adolescent; spending time with friends and family; and living a purposeful life without depression. Living well means most often enjoying these activities while spending time with family and friends. An exemplary quotation is, "...being able to have a life where everything is going good, and being able to live healthy...gets rid of some of your worries not only for yourself but for your friends and family...less worries means a less stressful life..." Discussion: By determining what "living well" means to adolescents with cancer, care teams and families can more easily understand patients' priorities. A firm grasp on patients' definitions of "living well" could relieve significant burden from families and increase families' willingness to honor adolescent treatment preferences. Findings may guide future psychosocial interventions.

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Mental Health

Postpartum Mental Health After Preeclampsia: Protocol Write-Up

BACKGROUND: Preeclampsia and mental health conditions, such as post-traumatic stress disorder (PTSD) and depression, are independently associated with cardiovascular disease (CVD) risk in women. A scant literature suggests a link between preeclampsia and postpartum mental health. We examined the prevalence of depression and PTSD in the "Heart Health 4 Moms" (HH4M) trial of a lifestyle intervention to reduce CVD risk among women with recent preeclampsia. Objective: To examine quantitative and qualitative data on mental health after preeclampsia. Design: Postpartum depression was ascertained using the Edinburgh Postnatal Depression Scale (EPDS) at baseline, 3 months, and end of follow-up at 9 months. A Modified Breslau Short Screening Scale for PTSD was added to the final questionnaire. Qualitative data are available from the intervention arm via community forum posts, weekly action plans, and lifestyle coaching sessions. Exit interviews were conducted among both arms. Qualitative data were extracted across sources, cleaned, and organized for analysis. Two members of the study team are independently coding these data in NVivo for themes related to mental health, e.g., trauma related to their pregnancy, postpartum depression, and PTSD. Preliminary results: 75 intervention and 75 control arm participants completed the EDPS and PTSD screenings. On preliminary analyses, 15% had probable depression, and 23% endorsed >4 PTSD symptoms related to their preeclamptic pregnancy. We identified 15 intervention arm participants with qualitative information from all four sources, with 20 in each arm completing final interviews. Themes such as "mental health", "PTSD", "depression", and "anxiety" were identified across qualitative data sources, especially on the community forum page started by participants to discuss postpartum mental and emotional health. Expected contribution: The current project is well-positioned to increase our understanding of mental health sequelae of preeclampsia. Quantitative insights will be complemented by qualitative data, contributing nuances of the lived experience of preeclampsia not captured by questionnaires. More specifically, our findings will gain insights needed to inform healthcare providers and other stakeholders on mental health care guidelines for the "fourth trimester," the immediate postpartum period in which women may be particularly vulnerable to physical and mental health concerns.

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CLINICAL AND TRANSLATIONAL RESEARCH

Infectious Disease

Clinical Epidemiology and Microbiology of Children with Orbital Cellulitis

BACKGROUND: The microbiology of pathogens causing orbital cellulitis in children is evolving over time, with studies from around ten years ago describing MRSA as responsible for anywhere from 0 to 13% of cases of orbital cellulitis. However, the prevalence of community-acquired MRSA infections has declined over the past decade. A current understanding of the bacteria most commonly found to be responsible for orbital cellulitis would be important to inform the empiric antibiotic regimens for cases of orbital cellulitis in which no microbiologic data is available. METHODS: This is a single center retrospective cohort study of children <18 years hospitalized with orbital cellulitis at Children's National Hospital between January 1, 2012 to July 31, 2018. We excluded children with immunocompromising conditions, cystic fibrosis, underlying craniofacial abnormality, or recent craniofacial or otolaryngologic surgery. Baseline clinical characteristics, microbiologic data, clinical outcomes, and antibiotic treatment data were abstracted through structured chart review and summarized with descriptive statistics. Statistical comparisons were made using t-test for continuous and chi-squared test for dichotomous variables. RESULTS: We identified 175 children that met inclusion criteria, with an average age of 7.8 years; 65.1% were male, 52.6% were African-American, and 10.9% were Hispanic. Most (69.1%) had no underlying medical problems, 12.6% had asthma, and 17.7% had allergic rhinitis. The median duration of orbital symptoms prior to presentation was 3 days. An abscess or phlegmon was identified in 124 of the 175 (70.8%). Out of the 175 patients with orbital cellulitis 30.8% of patients had abscess drainage procedures completed. There were no significant differences found in clinical/outcome characteristics between those with subperiosteal abscess vs those without subperiosteal abscess. Twelve patients (6.9%) developed intracranial complications. The most commonly identified pathogens were Streptococcus intermedius (21/54, 38.9%), followed by Staphylococcus aureus (12/54, 22.2%). Of these 12 S. Aureus cases, 4 had MRSA infections. Anti-MRSA therapy was provided empirically in 99.4% of patients with orbital cellulitis. CONCLUSIONS: One-quarter of all patients hospitalized for orbital cellulitis underwent surgical drainage, and S. intermedius and S. aureus were the most commonly isolated pathogens. MRSA was isolated in four patients (7.0%). No significant differences in demographic characteristics between those with subperiosteal abscess vs those without subperiosteal abscess.

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Anesthesia

Objective Assessment of Ketorolac Analgesic Effect in Postoperative Pectus Excavatum and Pectus Carinatum Patients: An Observational Study

BACKGROUND: An objective assessment of pain and analgesic efficacy is an unmet need. While the standard of care for pain is the Visual Analog Score, this method is subjective and does not guide use of a specific intervention. In order for pain management to improve, it is essential that there is an objective measure for the processes underlying pain transmission. OBJECTIVE: This observational study evaluated the analgesic effect of Ketorolac in postoperative pectus excavatum and pectus carinatum patients utilizing a novel method employing pupillary reflex dilation. METHODS: An observational pre/post dose study measured the change in neurostimulus-evoked pupillary reflex dilation (nPRD) in postoperative pectus excavatum and pectus carinatum patients at Children's National Medical Center (N=10, 10 male, 15-19 yrs) who received 30 mg intravenous Ketorolac as part of their care. Measurements occurred in triplicate at baseline and approximately one hour following Ketorolac administration. An electrical stimulus elicited pupillary reflex dilation at 2000, 250, and 5 Hz for the A-beta, A-delta, and C-fibers, respectively. The perception threshold was determined at baseline and used throughout observation. The main outcome variables measured were area under the curve (AUC) for each nPRD, amplitudes of the curve, and pain scores. RESULTS: Paired t-tests were used to compare amplitudes and AUCs before and after Ketorolac for each fiber type. There was no statistically significant change in amplitude following Ketorolac for any of the fiber types. Within pectus excavatum patients (N=9), the effect of Ketorolac on C-fiber nociception assessed using the AUC was trending towards significance (p=0.075), while there was no statistically significant effect on AUC of A-delta or A-beta fibers. Because a prototype device was used, analyses were also completed using the clearest reading. Ketorolac had statistically significant effects on the AUC of the C-fiber (p<0.05), effects trending toward significance on the AUC of the A-delta fiber, and no effect on the A-beta AUC. There was no correlation between changes in pain score compared to changes in AUC or amplitude. CONCLUSIONS: The data from this study support the use of this technology to determine analgesic impact on nociception. Primary analyses suggest that Ketorolac affected nociception in the A-delta and C-fiber in post-surgical patients. Assessing the absolute effect of Ketorolac is difficult given that postoperative patients receive polypharmacy as part of their standard care. Given the difficulty of objectively assessing pain, future study into analgesic effect should utilize this method to classify the fiber-specific effect of analgesics.

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Dermatology

Mediators of Sun Protection and Skin Cancer Surveillance Interventions: A Systematic Review

New cases of cutaneous melanoma, a form of malignant skin cancer, are diagnosed every year. Numerous interventions have been established to help educate high risk individuals about risk factors, improve sun protection behaviors, and conduct self skin evaluations. Additionally, systematic reviews have been conducted to outline the efficacy of such interventions. These reviews, however, have not focused on the mediating variables for these studies. A mediating variable serves as a causal intermediate between an intervention and the desired outcome. To address this gap, we conducted a systematic review to determine the mediating variables affecting sun protection behaviors among high risk melanoma patients exposed to skin cancer related interventions. Identifying these variables will provide insight that will help in the design of more effective and cost efficient interventions. We hypothesized that self efficacy (an individual's belief in his/her ability to accomplish something), knowledge of skin cancer, attitudes towards skin cancer, and perceived risk of skin cancer are significant mediators. Our literature search was conducted using online databases such as CINAHL, Cochrane Database of Systematic Reviews, Embase, Google Scholar and PubMed using a variety of search terms. Additionally past reviews of similar topics were surveyed for relevant articles. Study inclusion criteria were as follows: (1) All populations were accepted with the exception of those targeting healthcare professionals; (2) An intervention (psychosocial, multimedia, mailed materials, telephone, etc) was used in each study; (3) There must be a comparison group for each intervention (separate intervention and/or a control comparison); (4) The outcome measured must seek to change a sun protection behavior (sunscreen use, tanning frequency, etc); (5) Study design must be a randomized controlled trial; (6) The study must be published in a peer reviewed journal; (7) The study period must lie between January 1, 2000 and May 31,2018; (8) A formal statistical method must be used to test for mediation of the intervention effects on one or more of the outcomes. A total of XX articles were deemed eligible for the study that will be included in the final review. Study coding was conducted to assess the quality of each article using an 11 point scale. Studies were awarded one point for each criteria that was met. Ongoing efforts to finalize coding is underway. Upon completion of the study, the results from this review will provide insight that is relevant to the design of future interventions aimed at changing human behavior.

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Surgery

Minimally Invasive Drainage of Ureteral Stump in a Pediatric Patient with a Duplicated Collecting System

A duplicated renal collecting system is a congenital abnormality that is classified as partial or complete. In complete duplicated systems, the upper renal moiety drains into either a ureterocele or an ectopically-inserting ureteral orifice, both of which may cause upper tract obstruction. The lower renal moiety ureter inserts orthotopically. In the case of upper moieties with minimal-to-no differential function, upper pole heminephrectomy and ureterectomy can be a definitive surgical treatment. Rarely, the residual upper pole ureteral stump develops complications collectively known as ureteral stump syndrome (USS). Historically, USS has been treated with open or laparoscopic resection of the residual stump. We present the case of a fourteen-year-old female with USS after robot-assisted upper pole heminephrectomy with subtotal distal ureterectomy and distal stump marsupialization. A novel minimally invasive computed tomography-guided transgluteal approach was used to gain access to the distal ureteral stump allowing drainage of the infected contents and visualization of the ectopic orifice for definitive distal ligation.

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Neurology

Relationship Between Electrode Location and Neuropsychological Outcomes of Deep Brain Stimulation in Parkinson's Disease

Parkinson's disease (PD) is characterized by various motor symptoms. In addition to these motor symptoms, patients demonstrate many non-motor symptoms including mood disorders, behavioral abnormalities, and cognitive disturbances. Following long-term treatment with anti-parkinsonian medications, development of dyskinesia and symptom fluctuations become major challenges with therapy. Deep brain stimulation (DBS) of the sub-thalamic nucleus (STN) is a widely accepted surgical therapy to treat PD when patients become refractory to medication. Bilateral STN-DBS significantly improves the primary motor symptoms, but it is known that some non-motor symptoms of PD can worsen after this procedure. The point of entry of the DBS in the frontal lobe and its trajectory towards the STN passes through different brain areas and can theoretically cause tissue damage, which can be a source of worsening non-motor symptoms after DBS. We aim to explore the hypothesis that differences in the neurobehavioral outcome of STN-DBS surgery depend on the point of entry of the DBS lead in the frontal lobe. We are studying 27 PD patients who underwent bilateral STN-DBS surgery at the NIH in the last 6 years. To assess how DBS-STN lead trajectory affects non-motor symptoms, we compared the pre and post-surgery changes in frontal behavioral measurements in four domains: apathy, disinhibition, executive dysfunction, and verbal fluency (semantic and phonemic). To determine the entry point of the DBS leads and allow comparisons across patients, we normalized patients' anatomical brain scan to the MNI template and determined the x, y, z coordinates of the entry points using Analysis of Functional Images (AFNI) software. We then correlated the variations in entry point (x, y, z) in each hemisphere of the brain with the pre to post-DBS changes in the neuropsychometric data. We also calculated the Euclidean distance of the left entry point to Broca?s area and correlated this with change in both semantic and phonemic verbal fluency. There was a significant correlation between the y-coordinate of the left hemisphere and change in apathy score (r = -0.41, p = 0.03). There was also a significant correlation between the left z-coordinate and the change in semantic verbal fluency (r = 0.44, p = 0.03). Otherwise, there were no other correlations between the x, y, or z coordinates and apathy, disinhibition, executive dysfunction, or verbal fluency scores. Follow-up studies to be conducted include correlating other measures of DBS, such a trajectory or tip location, with the neuropsychometric outcomes used in this study.

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Anesthesia

Efficacy and Safety of Single-Dose Ketorolac in Primary Palatoplasty: A Prospective Analysis

BACKGROUND: Optimal postoperative pain management after primary palatoplasty (PP) remains unclear. Ketorolac has demonstrated efficacy comparable to opioids with minimal adverse effects. Nevertheless, concerns regarding postoperative bleeding restrict its use. This prospective study examines the efficacy and safety of single-dose ketorolac for postoperative pain control in PP. Methods: We prospectively studied a consecutive cohort of patients undergoing PP. Subjects were classified into two groups: Group 1 received standard doses of acetaminophen and narcotics, and Group 2 received an additional perioperative single dose of ketorolac. Safety and efficacy of ketorolac was assessed through numerous outcomes including bleeding and FLACC pain score using multivariable linear regression, Fisher's exact test, and Poisson regression. Results 100 patients were included (Group 1 n=63; Group 2 n=37). There was no significant difference between median length of stay (LOS) for both groups (p=0.79). Nine patients received postoperative blow-by O2, 2 from Group 1 (5.4%) and 3 from Group 2 (4.8%; p>0.05). There was no significant difference in initial, 1-hour, 6-hour, or LOS FLACC score (p>0.05). The mean dose of opioid rescue medication measured as morphine milligram equivalents (MME) for hydromorphone, fentanyl, and oxycodone did not differ between groups at one hour, six hours, in PACU, or inpatient unit total (p>0.05). Significant postoperative hemorrhage was not observed in either group. Conclusion: This is the first prospective study to demonstrate that a single dose of immediate postoperative ketorolac after PP does not increase the risk of postoperative hemorrhage. Use of perioperative ketorolac should be considered safe in PP.

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Cancer

Sensitivity of Malignant B Cell Lines to PI3KD Inhibitors

With an estimated 117,470 new cases of B-cell malignancies in the United States in 2016, B-cell malignancies are currently treated with phosphoinositide-3 kinase delta (PI3KD) inhibitors, such as idelalisib, a p110d isoform-specific PI3K inhibitor.1, 2 However, despite idelalisib being an effective treatment for B-cell malignancies, 28% of patients are resistant to idelalisib therapy.2 The mechanism of this resistance is unknown. Our laboratory's proposed mechanism of resistance is aberrant over-expression of the short isoform of PI3KD (PI3KCD-S), formed through alternative RNA splicing in idelalisib-resistant patients. We hypothesize that a higher ratio of short to long (S/L) isoforms of PI3KD is associated with greater resistance to idelalisib. Previous cell-free kinase assays in our laboratory have demonstrated that the recombinant short PI3KD isoform, but not the long isoform (PI3KCD-L), is resistant to the PI3KD inhibitors idelalisib, umbralisib, and duvelisib. We tested two additional PI3KD inhibitors, copanlisib and buparlisib, recently shown to be effective in treating B-cell malignancies. Both inhibitors were likewise ineffective in reducing activity of PI3KCD-S, while potently inhibiting activity of PI3KCD-L. Then, we tested the sensitivity of malignant B-cell lines (JeKo-1, Maver-1, Granta, JVM-2), which express varying levels of the short and long mRNA variants of PI3KD, to idelalisib using Caspase-glo® 3/7 assay to measure apoptosis and BrdU assay to measure proliferation. The results demonstrate that the four cell lines possess varying sensitivities to idelalisib, suggesting that the expression level of PI3KCD-S may have an important role in conferring varying degrees of resistance to PI3KD inhibitors. With these results, we correlated these varying degrees of resistance to idelalisib with S/L expression ratios measured by RT-PCR. Malignant B-cell lines JeKo-1 and JVM-2, the two cell lines that were resistant to the apoptotic and anti-proliferative effects of idelalisib, exhibited higher S/L ratios, while the two cell lines that were sensitive to the effects of idelalisib, Granta and Maver, showed lower S/L ratios. While these results are preliminary, they support our hypothesis that aberrant over-expression of PI3KCD-S contributes to primary and acquired resistance in patients with B-cell malignancies. In the future, we aim to accomplish two tasks: 1) employ CRISPR to knock-out the PI3KD gene in malignant B-cell lines followed by ectopic over-expression of either the long or short variants of PI3KD, and 2) procure retrospective human patient specimens to measure the S/L ratio of PI3KD and correlate these findings to idelalisib resistance.

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Hematology

Prevalence, Characteristics and Risk Factors of Peripherally Inserted Central Catheter-related Venous Thromboembolism in a Pediatric Intensive Care Unit: A Cross-Sectional Retrospective Study

BACKGROUND: Central venous catheterization represents an important risk factor for venous thromboembolism (VTE) in critically-ill children. Peripherally inserted central catheters (PICCs) are used with increasing frequency in this population due to their ease of insertion and removal with little or no sedation. Recently, it has been demonstrated that PICC placement in children carries a significant risk of VTE. There is limited data on characteristics and predictive risk factors of PICC-related VTE in critically-ill children. Aims: Report prevalence, characteristics and risk factors of PICC-related VTE in critically-ill children who were admitted to the pediatric intensive care unit (PICU) at our center. Methods: We identified all patients <18 years of age with no prior VTEs who were admitted to PICU (2013-2018) and required PICC placement by searching radiology reports using MON-TAGE Search and Analytics software followed by chart reviews to confirm cases for inclusion in the study. Clinically-symptomatic and radiologically-confirmed PICC-related VTEs were identified from a prospectively-maintained institutional thrombosis database. To determine independent risk factors, univariate and multivariable logistic regression analyses were performed comparing patients with PICC-related VTE and patients experiencing no PICC-related VTEs. The results of multivariable modeling are presented as odds ratios, 95% confidence intervals and P-values. Results: During the study period, 350 patients were admitted to the PICU and required a PICC. Twenty-seven patients developed PICC-related VTEs at median of 5 days (range 1-93 days) yielding a prevalence of 7.7% and 27.9 VTEs per 1000-PICC-days. Non-infectious medical risk factor, PICC dysfunction, blood product transfusions, prolonged PICU stay and viral infections were identified as independent, statistically-significant risk factors for PICC-related VTEs by multivariable modeling. Conclusions: PICC placement was associated with increased risk of PICC-related VTE in our study population. We identified several significant factors for assessing the risk of PICC-related VTEs in critically-ill children which warrant prospective validation.

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Mental Health

Role of GLP1 Analogue on Major Depressive Disorder in T2DM

Depression is a widespread condition that develops due to a multitude of etiologies. The rate of depression is approximately three-fold higher in subjects with type 2 diabetes (T2DM). Subjects with depression often over-feed to cope with depression at the cost of worsening diabetes. Endogenous satiety hormones such as leptin and glucagon-like peptide-1 receptor agonists (GLP1A) may play a positive role in improving depression and anxiety. We hypothesized that when comparing the PHQ-9 depression scores of two groups of patients with diabetes, subjects on a GLP1A medication will have a lower score, thus indicating lower level of depression, than the those not on a GLP1A medication. We performed a retrospective chart review. The demographics of the patients were as follows: 20-70 years of age with diagnoses of type 2 diabetes and Major Depressive Disorder (MDD), BMI>24.9, HbA1c 30. Patients in Group A were on a GLP1A (n=15), while those in Group B were on any medication other than a GLP1A (n=30). The PHQ-9 scores were stratified into 2 categories; a score between 5-14 was categorized as mild to moderate depression, and a score between 15-27 was categorized as moderate to severe depression. The data was compared using t-tests for two independent means. The average PHQ-9 score in the mild to moderate group in Group A was 8.4 versus 8.6 in Group B (p=0.41). However, the average PHQ-9 score in the moderate to severe group in Group A was 17.1 versus 20.2 in Group B (p=0.07). In the moderate to severe depression category, patients taking GLP1A had a lower PHQ-9 score (17.1 vs 20.2) with p-value very close to significance. Consequently, this data indicates that GLP1 agonists may be associated with lower depression scores, and thus can potentially be an additional therapeutic agent in treating moderate to severe depression. Due to the small number of subjects, our results need further evaluation in a prospective study to establish a finite association and causality.

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Cancer

Comparative In Silico Analysis of Pre-Operative Scanning Beam Proton Therapy, Intensity Modulated Photon Radiation Therapy, and 3D Conformal Photon Radiation Therapy in Adult Soft Tissue Sarcoma

PURPOSE/OBJECTIVES: Wound healing complications remains a common morbidity with pre-operative radiation for soft tissue sarcoma. Proton therapy can spare excess dose to normal structures and may have the potential to reduce this morbidity. Our aim was to evaluate dosimetric differences in modern scanning beam proton therapy (PT) versus conventional photon 3D conformal (3DCRT) and intensity modulated radiation therapy (IMRT) for the pre-operative treatment of soft tissue sarcoma (STS). Materials/Methods: The existing 3DCRT (N=7) and IMRT (N=12) data of 19 adult STS patients treated pre-operatively at our institution were used to create proton plans using Raystation Treatment Planning System v8.A. Volumes were delineated and doses reported consistent with ICRU reports 50, 62, and 78. Target volumes were robustly optimized for 100% CTV coverage with 3.5% range uncertainty and 3mm setup uncertainty. The prescribed dose was 50.4 Gy for 3DCRT, IMRT, and PT delivered in 28 fractions. For PT doses are reported in Gy (RBE) = 1.1 Gy. Constraints for organs at risk (OARs) were joint and bone V50<50%. Mean dose to each OAR and integral dose were compared by student T-test with P<0.05 significance. Results: Median patient age at start of RT was 58 (range 27-90). Of the 19 patients, 13 patients had primary tumors of the lower extremity and 6 patients had upper extremity tumors. A minimum 99% CTV coverage and OAR constraints were achieved for all proton plans. PT reduced the integral dose to the body by an average of 136.47% (5.56-323.65%, p <0.01) (Table 1). The average dose to Body-CTV was 345±320 Gy (RBE) for PT and 656±349 cGy (RBE) for RT (p <0.00001). The average dose to Body-PTV was 258±278 Gy (RBE) for PT and 562±300 cGy (RBE) for RT (p <0.00001). For the proximal joint, mean dose was $1024 \pm 1190 \text{ cGy}$ (RBE) for PT and $1973 \pm 1402 \text{ cGy}$ (RBE) for RT (n=10, p<0.05). For the proximal bone, mean dose was 1715±1177 cGy (RBE) for PT and 2748±1104 cGy (RBE) for RT (n=19, p<0.00001). Conclusions: Proton therapy maintained target coverage while significantly reducing the dose to the proximal organs at risk (bone and joint), normal tissues, and the integral dose compared to photon therapy. Further investigation is warranted to validate these dosimetric findings and potential clinical benefit in the management of adult soft-tissue sarcomas.

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Critical Care

The Kitchen Sink: Mortality Assessment of Salvage Therapies in Refractory Shock

LEARNING OBJECTIVES: Refractory shock remains a challenge with nearly ubiquitous mortality. Novel therapies are needed to maintain hemodynamics when conventional mechanisms have failed. Several exploratory therapies display potential efficacy in the literature but, it remains unclear which therapy is superior. We aim to clarify the efficacy of the current salvage therapies: Angiotensin II (ATII) vs Methylene Blue (MB) vs Vitamin C with thiamine and hydrocortisone (Vit C) for refractory shock. We hypothesize that these therapies will improve survivability and decrease other vasopressors in patients with refractory shock. Methods: We utilized a retrospective review of patients with refractory shock started on ATII, MB, and/or Vit C in a single center mixed ICU. We collected baseline demographics, shock etiology, APACHE II, mortality, etc. The primary outcome was mortality and secondary outcome was change in standard vasopressor requirements after initiation of these therapies. The groups were analyzed by whether they received one intervention alone, or a combination of therapies. Results: 56 patients were included in the ATII group, 21 patients in the MB group, and 114 in the Vit C group (total n= 191). As monotherapy, those that received ATII (34), mortality was seen in 85.3% (29), for MB (9), 77.8% (7), and for Vit C (79), 51.9% (41). After adjusting for APACHE II, those who received ATII (monotherapy/combination) had 2.85 times higher odds of mortality than those who did not receive the drug (CI 1.28 - 6.33, p=0.0103). Vit C, however, showed 65% lower odds of mortality when compared to those who did not receive it (aOR 0.35, CI 0.14 - 0.87, p=0.0231). No statistical significance was seen for MB (aOR 2.80, CI 0.53-14.78, p=0.2254). The vasopressor requirements decreased over the first 24 hours after starting therapy for these drugs, but ATII overall still required higher doses of norepinephrine and vasopressin compared to Vit C (p=0.0011, p=0.0026 respectively). Conclusion: While these therapies have shown improvement in hemodynamics, this study questions the impact on overall mortality. This could be due to the baseline low survivability in this patient population and not initiating these rescue therapies soon enough. More prospective studies are needed to further clarify their potential role in refractory shock.

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Cancer

Designing a Novel Nanotherapeutic Device for Targeted Treatment of Advanced Glioblastoma Multiforme

With a persistent 5% 5-year survival rate, the need for novel therapeutic strategies to treat Glioblastoma Multiforme (GBM; a stage IV brain cancer) remains great. Nanomaterials, particularly Prussian Blue Nanoparticles (PBNPs), present a unique means to achieve cancer cell death through both localized hyperthermia and sensitization of cancer cells to subsequent cell-based immunotherapies. In this work we present "aFn14-PBNP": a novel nano-bioconjugate against GBM with the ability to not only induce immunogenic cell death (ICD), but also reduce the cancer cell's invasiveness and sensitize the cancer cell to subsequent immunotherapies. PBNPs were synthesized via a pre-existing nanoprecipitation protocol. The surface of these particles was then covalently decorated with fluorescent GBM-specific targeting moieties (an antibody against aFn14). Photothermal Therapy was performed on a population of U87 GBM cells by combining bioconjugated PB-NPs with near-infrared LASER energy. ICD, as measured by flow cytometry, was successfully achieved in upwards of 84% of the cell population. Moreover, the remaining cell population that did not undergo cell death as a result of direct thermal injury was found to have upregulated T-cell costimulatory markers, downregulated invasive markers, and upregulated TSAs that are targetable by subsequent cell-based immunotherapeutic adjuncts (i.e. CAR T-Cells). Through further exploration of this combinatorial nanoimmunotherapeutic treatment modality, it is the hope that strides are made in reducing the dismal mortality rate of this fatal cancer.

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- THE GW SCHOOL OF MEDICINE AND HEALTH SCIENCES 2020 RESEARCH DAY -

CLINICAL AND TRANSLATIONAL RESEARCH

Obstetrics and Gynecology

Video-Based Contraceptive Counseling in the Acute Care Setting Increases Interest in Most Effective Contraceptive Methods

The American Congress of Obstetricians and Gynecologists (ACOG) endorses long acting reversible contraceptives (LARCs), such as the intrauterine device and implant, as the most effective reversible contraception for most women. Yet, long acting reversible contraceptive use is significantly higher among medical providers than in the general population. Despite a growing body of literature supporting the use of LARCs, gaining access to the most effective means of contraception remains challenging for many. Current barriers are diverse, but they include a lack of knowledge about LARCs. Given that traditional forms of lengthy face-to-face counseling may be hampered in the modern era of medicine, novel approaches to utilize video-based contraceptive counseling (VCC) may be the promising frontier in patient education to increase utilization of the most effective contraceptive methods. The IRB approved project entitled "Acute care long acting reversible contraceptive placement: a compare and contrast study" had the primary objective to survey women at an emergency department and urgent care to determine the level of interest in LARC counseling and/or placement occurring in an acute care setting compared to a successful OBGYN referral. The secondary results of expressed interest in LARC methods, pre- and post-VCC are the focus of this report. An independently produced four minute video reviewed the benefits and risks of the most popular LARC and non-LARC contraceptive methods. English speaking women ages 18-50 with non-life-threatening complaints who met specified criteria were administered an iPAD survey in a private setting using REDCap® software. After completing the first half of the survey, participants were required to view the VCC and were then asked the same questions about contraception after having learned more about each method. A total of 290 women were surveyed among both locations and when asked about their "ideal form of birth control" pre- and post-VCC, 37% of respondents changed their answer after the four minute educational video. 24% changed their response from a non-LARC method to a LARC method, while 9% changed from a non-LARC to an alternate non-LARC, 2% changed from a LARC to an alternate LARC, and 1% changed from a LARC to a non-LARC. By using video-based contraceptive counseling to expand knowledge about all forms of contraception, interest in the most effective contraceptive methods was increased. Future studies can posit this question as their primary objective and obtain provider input on video utility in the OBGYN clinic setting.

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Neurology

Quantitative Positron Emission Tomography using MRI-Informed Segmentation for Focal Epilepsy

OBJECTIVE: To investigate the utility of quantitative fluorodeoxyglucose-positron emission tomography (FDG-PET) analysis for seizure-onset lateralization with MRI-guided segmentation. BACKGROUND: Identifying the seizure focus can be a challenging step in the surgical evaluation of pharmacoresistant epilepsy. FDG-PET is a powerful tool for identifying focal and regional metabolic changes, but is clinically limited to qualitative interpretation of images. However, extracting quantitative FDG uptake values may improve lateralization and localization of the seizure focus. DESIGN/METHODS: Patients with FDG-PET and volumetric MRIs were identified from the GW Epilepsy Surgery Database. MRIs were reconstructed using Freesurfer (v6.0), and PET images were co-registered, pre-processed, and segmented with MRI using PETsurfer. Standardized parcellation atlases were used based on surface anatomy or functional MRI in healthy adults, allowing for comparison between homologous cortices in the native brain space and laterality index calculation for cortical/sub-cortical segments. FDG uptake values relative to the pons and non-rescaled values were calculated from co-registered PET/MRI images. The two groups were compared using Student's t-test or Mann-Whitney U test, and surface-based general linear model analysis of the voxels and cortical segments. RESULTS: 28 patients were included. Using a functional segmentation method, we detected network abnormalities of FDG uptake in the ipsilateral limbic system, default mode network, and ventral attention system (all p<.05). Anatomical segmentation of cortical and subcortical values had significant lateralizing values in the hippocampus (p<.01), left/right pallidum (p<.05), and the temporal lobe and entorhinal cortex (p<.05). CONCLUSIONS: Quantification of FDG-PET values based on MRI-quided segmentation provides lateralization and potentially localization values for pre-surgical evaluation. Certain anatomical and functional segments show larger differences between left and right-onset focal epilepsies; together these may contribute to higher FDG-PET sensitivity and specificity. Further studies using statistical and machine learning models are underway to establish lateralizing and localizing values of quantitative PET in clinical settings.

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Mental Health

Access to Integrative Medicine: Bridging the Gap at Bread for the City

Health disparities plague our nation's capitol as we continue to have a shortage of providers serving low-income patients-nearly one-quarter of the population of Washington, D.C. falls into this category. Despite evidence on the efficacy and cost-effectiveness of integrative medicine, integrative care remains unavailable to many. For example, massage and acupuncture have been demonstrated as effective tools in the management of pain, but remain less commonly utilized among low-income populations. Currently in D.C., integrative medicine services are inaccessible to this medically underserved population as most practices are offered in high-cost boutique settings that are unaffiliated with larger medical institutions and unable to take insurance. The purpose of this project is to bridge the gap in access to integrative medicine for underserved low-income populations. Data was collected through literature review, key informant interviews, and site visits. As a pilot program, Access to Integrative Medicine (AIM) Health Institute partnered with local community clinic Bread for the City (BFC). AIM is the first 501(c)3 in the greater Washington area offering integrative services to low-income patients regardless of insurance status or ability to pay. BFC is a Federally Qualified Health Center (FQHC) and medical home for over 3,000 patients, recognized by the Health Resources and Services Administration (HRSA) as an Access Enhancer and Health Disparities Reducer in 2019. Utilizing funds from a HRSA grant, massage therapists and acupuncturists were recruited by AIM to offer free integrative medicine services for 50-75 established BFC patients. Patients are referred by providers for chronic pain conditions including lumbar back pain, joint pain, sciatica, and fibromyalgia. Currently services are offered as 45-minute individual massage therapy sessions on Tuesdays, and 1-hour community acupuncture sessions on Fridays. In an attempt to make scheduling equitable, patients call for appointments on a first-come first-serve basis starting one week prior to date of service. Patients return for repeat visits and report to providers improved pain and increased quality of life (QOL). While this pilot program appears successful in offering integrative services to underserved low-income patients at a FQHC in D.C., further analysis is required. Qualitative analysis assessing pain and opiate use reduction, as well as QOL improvement utilizing PROMIS, is in progress and awaiting IRB approval. Further, in order to expand access to other underserved low-income patients in the D.C. area, needs assessments at other clinics are warranted.

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Neuropathological Patterns Of Prematurity-Induced Cerebellar Injury In Humans

Infants with cerebellar injury due to prematurity are 36 times more likely to be diagnosed with autism spectrum disorders (ASD; with adaptive learning deficits as a hallmark) than term infants. Preterm birth is often associated with maternal immune activation, and premature infants are also exposed to prolonged periods of hypoxia and inflammation. Neuroimaging studies in premature neonates have identified alterations in the cerebellum; however, detailed human cellular and molecular studies of human premature infants are not available. We hypothesize that premature birth results in cerebellar injury and disruption of Purkinje cell (PC) circuitry of the posterior cerebellum. Methods: Postmortem premature human cerebellum (n=31), and age and gender-matched control cases (n=7) were analyzed with a focus on cerebellar hemispheres and the dentate nuclei; regions involved in the cerebro-cerebellum tract, which is important for cerebellar predictive learning. We performed morphological characterization using H&E and immunostaining for NeuN for mature neurons and neurons expressing calbindin, neurofilament and microtubule-associated protein 2 (MAP2) for PC dendritic arbors). We used confocal microscopy and Imaris' Filament Tracer to study and quantify cellular and dendritic arborization in the neuronal populations. Results showed that in premature infants, the cerebellar cortex had decreased PC dendritic density and a hypo-cellular external and internal granule cell layer with a decreased number of PCs. In addition, the thickness of the molecular layer was decreased and obliterated with apparent axonal swellings, suggesting cytotoxic edema, as compared to controls. Furthermore, hypoxic acidophilic PCs were present in the posterior cerebellum, with a wide repertoire of cell death ranging from apoptosis to hybrid forms of cell death continuum and necrosis. Necrotic PCs characterized by irregular nucleolus, edematous cell body, and abnormal cell contour were present in the cerebellum of premature infants. Finally, corresponding injury was identified in the cerebellar dentate nucleus, with marked neuronal damage, axonal swelling, rarefied white matter, and intense vacuolization, as compared to control cases. To conclude, in humans, prematurity is associated with specific patterns of injury of the cerebellum involving both the cerebellar cortex as well as the deep cerebellar nuclei. These data suggest that prematurity results in the disruption of the posterior cerebellar connectome which is involved in the pathogenesis of autism spectrum disorder.

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Cancer

p38 Signaling Regulates Human Cutaneous Metastatic Melanoma (MM) Invasion and MM-Dependent Disruption of Keratinocyte Differentiation

Advancing our understanding of cutaneous MM invasion mechanisms is vital for developing new mechanism-based therapies and improving MM outcomes. Here we describe an optimized organotypic human skin equivalent co-culture system of primary epidermal keratinocytes, MM cells, and normal stromal fibroblasts recently developed in our laboratory in order to reliably model early invasive behavior of human MM as well as melanoma-keratinocyte crosstalk in the tissue microenvironment that more accurately reflects the disease pathology. p38 kinases p38alpha and p38delta are the predominant p38 isoforms in keratinocytes, while p38alpha and p38beta are the most abundant isoforms in human MM cells. However, the potential roles of p38 kinases in regulation of human cutaneous MM invasion or in control of melanoma-keratinocyte communication remain to be elucidated. Our data showed that in human skin equivalents harboring human A375 MM cells, pharmacologic inhibition of p38alpha/p38beta isoforms with specific inhibitor SB203580 led to increased invasion of A375 cells into the dermis, as manifest by significantly increased size of the dermal nests of A375 cells relative to size of those in control vehicle-treated cultures. The hyper-invasive MM phenotype observed in skin equivalents treated with SB203580 was reversed by treatment with potent pan-p38 inhibitor Compound 62 (C62) back to the levels displayed by the control cultures. These data suggest that p38alpha/p38beta function to restrict MM invasion, and support a role for keratinocyte p38delta in promoting MM invasion in this model system. Furthermore, reflecting effect of melanoma on keratinocyte differentiation as observed in human disease, skin equivalents harboring A375 MM cells displayed a marked disruption of keratinocyte differentiation program as evidenced by reduced cornification, the absence of granular layer, and severely diminished expression of differentiation markers. Pan-p38 inhibition partially restored keratinocyte differentiation, supporting a role for p38 signaling in MM-dependent loss of the latter in this system.

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Otolaryngology

Novel Use of Lip Balm Ointment Under Tracheostomy Ties to Prevent Pressure Injuries and Skin Irritation in the Pediatric Patient

IMPORTANCE: Moist skin, friction from head movement, and an inability to offload pressure from tracheostomy ties can all lead to alterations in skin integrity and pressure injuries. Children with tracheostomies often have additional congenital abnormalities, comorbidities and cognitive deficits that can increase the risk of skin breakdown. Additionally, a number of children with tracheostomies have trouble controlling their oral secretions, which can accumulate on the neck and under tracheostomy ties. ChapStick® lip balm is a safe, accessible, and affordable ointment, which can be easily applied by caregivers to the neck. OBJEC-TIVES: To study the effectiveness of lip balm in preventing pressure induced skin breakdown in tracheostomy dependent children. STUDY DESIGN AND SETTING: Prospective study at tertiary care pediatric otolaryngology clinic. METHODS: The skin of tracheostomy patients presenting to clinic over a 12 month period was assessed and categorized as hyperemic blanchable (abnormal pre-pressure injury), hyperemic non-blanchable, partial thickness skin loss, or full thickness skin loss. Caregivers were instructed to apply ChapStick® Classic to the skin under soft ties. Patients were followed by a tracheostomy care nurse who monitored skin integrity. RESULTS: 30 patients enrolled and reported daily adherence with lip balm use. Median age was 6.1 years (interquartile range, IQR, = 1.3-12.2) with 12 females and 18 males. Median follow-up duration was 6 months (IQR = 3.5-9.5). The majority of patients (n = 22) were identified as having hyperemic blanchable skin. 97% (29/30) of caregivers reported a subjective benefit. 78.2% (95% CI: 56.3%-92.5%) of patients with hyperemic/irritated skin (n = 23) demonstrated complete resolution with continued application, and was found to be significant: 77% (23/30) of patients had skin hyperemia before application, while 17% (5/30) continued to have hyperemia after application (p < .001). There were no documented allergic reactions, accidental decannulations, or skin deterioration in the cohort. CONCLUSIONS: Lib balm appears to be a low-cost alternative in treating at risk pressure injuries in tracheostomy dependent pediatric patients. With rising healthcare costs, this ChapStick® protocol could be a tool for reducing excessive healthcare expenditure. We recommend that this skin care product be introduced to tracheostomy skin care protocols for use under tracheostomy ties. In the future, a randomized clinical trial with a control group will be necessary for more robust statistical analysis.

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Cancer

Targeting p38a/p38d Signaling to Modify the Responses to Cisplatin and EGFR Inhibitor Therapies in Human and Mouse Squamous Cell Carcinoma Cell Lines

Squamous cell carcinoma (SCC) is one of the leading causes of death with its incidence continuously rising each year. Current treatment modalities are commonly associated with toxicities and resistance, hindering favorable prognosis. We investigated the role of the stress-activated protein kinases, p38a and p38d, as potential targets for treating human skin and head and neck SCC using pharmacologic and siRNA knockdown approaches. We ran cell viability assays as well on SCC9 and murine oral cancer (MOC2) cells to investigate the role of p38a and p38d both independently and simultaneously, in response to treatments with AG1478 (AG), an EGFR inhibitor; Compound 62 (C62), a pan-p38 inhibitor; and SB 203580 (SB), a p38a/p38ß inhibitor. In a separate experiment, cells were transfected with siR-NA to knockdown p38a, p38d, or p38a/p38d together, following which they were then treated with AG or cisplatin and controls for each. The Delta Bliss synergy score was used to determine the effects of combination chemotherapy treatment. Western blots on MOC2 cell lysates were run to evaluate the expression of various cell signaling proteins between treatment groups. A kinase array kit was used to quantify the levels of various kinases in SCC9 in response treatment with C62 compared to a non-treated group. The overall delta bliss sum was -51.6 for MOC2 cells treated with 1mM AG and C62 across multiple concentrations indicating overall antagonism. SCC9 cells treated at 48 hours with cisplatin and SB or C62 showed antagonism at all concentrations. In SCC9 cells, the phosphokinase profiling assay revealed that serum-stimulated activity levels for p38, MSK1/2, and STAT5b were notably decreased with the addition of C62, while activity levels of Akt 1/2/3, beta-catenin, and Lyn increased under C62 treatment. Cell viability assays of siR-NA knockdown in SCC9 cells showed that administration of AG in p38a siRNA knockdown cells increased viability while AG administration in p38d knockdown increased cell viability at higher concentrations. Western blot analysis of MOC2 cell lysates showed treatment with both SB and C62 resulted in up-regulation of p-ERK at all time points compared to control. Our data reveal that p38a and p38d inhibition have varying effects on cell viability and proliferation in both MOC2 and SCC9 cell lines. Alternative survival pathways are up-regulated in response to p38 inhibition as evidenced by western blot and phosphokinase profiling assays which may explain the antagonistic effects seen with p38 inhibitors used in conjunction with cisplatin or AG.

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Firearm Education for Medical Students

On an average day in the United States, three hundred and ten people are shot, resulting in one hundred deaths. Victims of firearm violence encounter healthcare providers during a unique window when providers have an opportunity to impact outcomes. Despite the thousands of interactions between clinicians and victims, few U.S. medical schools have incorporated firearm violence into their didactic and clinical curricula. Health providers are not only major players in the acute trauma setting; they are powerful influencers in advocacy, education, and policy. At the George Washington School of Medicine and Health Sciences, a team of public health advocates, physicians, medical students, curriculum experts, and policy-makers developed a medical curriculum to equip students to identify cycles of violence, critically analyze community firearm violence data, prevent firearm injury, and develop evidence-informed policy. This course, entitled Applied Population Health (APH), was piloted in Fall of 2019. Students engaged with physician-advocates, community leaders in Washington D.C. and Baltimore, policy experts, and sociologists. Subsequently, they applied the knowledge to various scenarios in small-group discussion settings facilitated by public health mentors. This curriculum design accomplished two major goals: 1) education on firearm violence in the U.S., and 2) application of public health analysis and advocacy. In doing so, GW SMHS medical students gain an invaluable perspective on how to use their medical background, critical thinking, and health policy knowledge beyond the clinic. The 2019 APH course exposed students to the community violence piece of the larger firearm violence story. Firearm violence is a complex issue, and the mortality is attributed to suicide, homicide (community violence), domestic shootings, and mass shootings. Each demographic of victims has distinct social determinants and unique obstacles to staying safe. It is imperative to train the next generation of physicians to intervene to reduce harm for each victim of firearm violence. Looking forward, firearm education can be integrated into many different portions in our medical school curriculum. Projected additions to our curricula include suicides by firearms during the Brain & Behavior (Psychiatry) block of the medical curriculum with an adjunctive session in our Practice of Medicine: Interview course. There are also numerous opportunities to collaborate with GW's Milken School of Public Health and with our Law School to learn more about the Second Amendment, the Dickey Amendment, and research funding disparities between similarly deadly public health epidemics (e.g., the opioid epidemic).

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Geriatrics Fellowship-Family Medicine: Evaluation of Fellowship Program Accessibility and Content for Family Medicine Applicants

PURPOSE: Website content and accessibility has the potential to influence the applicant to decide whether to choose to interview for the program or not. The objective for our study is to determine the content and accessibility of the American Academy of Family Physicians Directory(AAFP) and accredited geriatric (family medicine) fellowship program websites. Methods: A list of geriatric (family medicine) fellowship programs was retrieved using the AAFP Directory and verified for accreditation. Contact information was compared between the database and the fellowship websites. The programs? website links were evaluated and compared with Google search. The websites? accessibility and content was assessed for program, education, and application overview. Results: 50 programs were identified, but 43 programs were chosen for analysis. Only 8 hyperlinks (21.1%) directly led to the fellowship website, with an average of 2.26 clicks compared to Google search with 1.02 clicks. There was an incongruence of over 50% of contact information between AAFP Directory and the website page. Regarding content, most websites were lacking in fellows' profile information, previous research studies, and application ID. Conclusion: AAFP Directory and fellowship websites can improve geriatric (family medicine) fellowship recruitment by updating their information and providing more accessible and accurate content.

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Paced Breathing Training Utilizing Virtual Reality

ABSTRACT BACKGROUND: Burnout is widely-recognized in the medical community. Paced breathing (PB) techniques can reduce stress and promote heart rate variability (HRV) which has been associated with decreased stress and improved health. Mastery of PB skills traditionally requires a professional biofeedback coach, which may be time-intensive and expensive. Immersive technologies like virtual reality (VR) may provide an engaging new medium for independent acquisition of PB skills. This study aims to assess the impact and feasibility of practicing PB independently, and to compare HRV and stress-reduction when the techniques are practiced in VR versus a mobile phone application. Materials and Methods: Medical students and other healthcare workers were recruited to participate and randomly assorted into a VR group or a mobile application group. Participants were asked to practice PB on their respective platforms. HRV was the main metric used to establish success of the PB training. Pre and post-study surveys were completed to establish any change in perceived stress before and after the study. Results: 221 PB sessions were completed among 45 participants. The VR group had significantly higher relative low frequency band measures of HRV when compared to the mobile group. There were no significant differences in length of session or survey responses. Discussion: Our study suggests PB training using the VR device was more effective than the group using the mobile application. Practicing PB in VR is a compelling and engaging tool to develop skills which can reduce stress and burnout in the medical field.

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Sexual Health in Previously Incarcerated Persons

BACKGROUND: Ten million persons from jails and 700,000 persons from prisons are annually released from over 6,000 U.S. correctional facilities. The transition from incarceration to community living is frequently associated with high risk, unhealthy activities, including unprotected sexual contacts. U.S. jails and prisons are increasingly committed to reentry programs that better prepare incarcerated patient populations for smoother integration into their communities. Little focus, however, has been invested in mitigating sexual health risks for soon-to-be-released inmates. A study examining risky sexual behaviors among previously incarcerated African American men showed that people with a history of incarceration were less likely to use condoms consistently and more likely to use drugs and/ or alcohol before sex and to exchange sex for drugs (Ricks et al, 2015). Another study showed that when comparing to nonoffenders, the relative risk for offenders testing positive for a STI was 3.9 for chlamydia, 6.6 for gonorrhea, 3.6 for syphilis, and 4.6 for HIV (Wiehle et al, 2015). This risky behavior can be due to significant transitional challenges that former inmates may face. It is also important to note that a recent study examining factors associated with drug use post-incarceration showed that 29.8% of participants had used drugs within one day after release and almost 50% within 2 weeks of release (Rowell-Cunsolo et al, 2018). Drug use is an important factor when considering the chance of engaging in risky sexual behaviors. Many of these patients have eluded health care in the community and thus are at a high risk for acquiring STIs upon release. Purpose: To create sexual health education material for persons released from correctional facilities Methods: We adapted the guidelines from the Center for Disease Control and Prevention, American College of Obstetricians and Gynecologists, and the Family Planning National Training Center to create a curriculum for educators in the criminal justice system and educational handouts for persons being released from U.S. correctional facilities Results: We created a curriculum geared towards nurse educators in the justice system and a handout for men and women. Conclusions: our next step is to pilot this educational material in correctional facilities and receive feedback from correctional health providers and their patients.

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synDRME: A Synthesis of Digital Resources for Medical Education

The education of future physicians requires an extensive use of resources and faculty to increase the health care workforce. However, global disparities arise based on the critical shortage of clinical and basic science faculty available to teach and train medical students. As the demand for physicians rises, medical schools are being tested with increasing enrollment while constrained by inadequate resources, faculty shortages, outdated infrastructure, and adherence to traditional educational methodologies. With significant improvements in internet technology, the possibility of delivering electronic learning to a global audience has become more feasible. In the face of severe faculty shortages in resource-constrained countries, medical schools can turn to e-learning for improved access to medical education. The objective of the synDRME project is to evaluate e-learning in African medical schools and determine how its utilization can enhance medical education in countries with limited resources and faculties. The goal is to collect, catalog, and evaluate e-learning resources based on their availability, usefulness, and functionality for the benefit of schools with limited resources. Resources and their respective evaluations are compiled on the synDRME website. Electronic resources readily available by search engines were compiled and evaluated based on an evaluation rubric previously developed by the project team. This rubric assesses resources according to appropriateness for patient population, website loading speed, cost, required technological infrastructure, time demands on faculty, comprehensiveness of content, and learning value. Basic science courses, including anatomy and physiology resources, were emphasized in order to fill gaps present on the site. Detailed resource evaluations were then uploaded to the syDRME website. The synDRME website now hosts over 350 evaluated online resources covering 15 traditional medical school courses, including basic sciences (e.g. anatomy, physiology) in addition to clinical courses. The comprehensive rubric provides medical school faculty in the developing world an opportunity to rate and compare the usefulness of online resources for their students. This project is ongoing and course evaluations continue to be compiled on the website with expanded course subjects. Once complete, the synDRME team can monitor and assess the penetration of these online resources into schools across the continent.

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A Regional Assessment of SALT Triage Implementation and Retention

In 2014, the Federal Interagency's Committee on Emergency Medical Services released their National Implementation of the Model Uniform Core Criteria for Mass Casualty Incident Triage. This report recommended that EMS agencies switch from the widely used triage methods of Simple Triage and Rapid Treatment (START) and its pediatric equivalent to Sort, Asses, Life-Saving-Interventions, Treatment/ Triage (SALT) (National Implementation Of the Model Uniform Core Criteria for Mass Casualty Incident Triage, 2014). In 2017, as a part of the National Continued Competency Program (NCCP) that was initiated by HEPRA, D.C. Health required all EMS providers credentialed in the District of Columbia to complete at least two hours of Mass Casualty Incident (MCI)/SALT triage training in order to renew their certifications (Hurley, 2017). D.C. Health?s EMS Division is interested in better understanding the adoption of SALT triage principles across the EMS agencies operating within the District of Columbia. The overall goal of this study is to assess the understanding and proficiency of EMS providers two years following the implementation of the policy by testing their performance in a simulated MCI scenario. In this Mass Casualty Incident (MCI) scenario, teams consisting of five EMS providers will enter a Targeted Automobile Ramming MAss Casualty (TARMAC) attack with 40 victims. The teams will consist of providers from different regional agencies to simulate the likely scenario that multiple agencies will respond to a true MCI. The providers will have 15 minutes to triage all of the victims and to ensure scene safety. Each scenario will have a second attacker that will need to be identified and reported to the on-scene police presence. The providers will be assessed on how many victims they were able to triage in 15 minutes out of the total number of victims, how many victims were correctly identified, and how long they took to triage each individual victim. This project will provide critical data about how our EMS providers respond to an MCI, specifically in regards to their triage methodology. As part of the study design, we intend to include a variety of EMS agencies that readily operate in and around the District of Columbia. This will not only give us an opportunity to actively assess the provider's ability to accurately and efficiently triage patients but indirectly examine the participant's ability to work collaboratively across responding organizations.

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Creation and Initial Assessment of a Low Cost, Easily Manufactured, Synthetic Fascia for Training

INTRODUCTION: Few models to train fascial closure are currently available. Cadaveric or porcine fascia based training is not ideal due to significant inter-specimen variability, low supply, cost, and ethical concerns. We aimed to create an inexpensive and easily manufactured synthetic fascia suitable for simulation-based fascial closure training. Methods Synthetic fascia constructs were manufactured using combinations of various silicones and mesh materials. Constructs were biomechanically evaluated via tensile suture pull-through testing. Iterative testing provided direction for each fascia construct with the goal of achieving pull-through forces within 10N of the average strength of porcine fascia. Each construct was qualitatively assessed by the surgeon authors to optimize the tactile feel, suture drag, and thickness compared with human fascia. The construct with the best biomechanical profile was qualitatively evaluated by ten surgeons experienced in fascial closure. Respondents were instructed to create four 3cm incisions and grasp the fascia with a Kocher clamp and toothed forceps. Incisions were then closed with 2-0 polypropylene and 1 polydioxanone sutures, using both 1cm bites/1cm advancement and 5mm bites/5 mm advancement techniques. Results The optimized synthetic fascia was created using a combination of silicone and powermesh with material cost for one 24x24cm sheet of \$4.09 and a one-time cost for mold creation of \$50. Manufacturing time for each fascial sheet was 20 minutes with a 16 hour curing time. 9/10 surgeons rated the construct as an acceptable teaching tool for abdominal fascial closures with only one respondent stating the construct felt "unnatural". The table below shows the breakdown of responses for each performance characteristic. Conclusions We describe a synthetic fascia construct that is inexpensive, easily manufactured, mimics the biomechanical profile of porcine fascia, and performs similar to human fascia as assessed by a group of experienced surgeons. Its use in simulation-based training should be encouraged and outcomes measured.

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Exploring the Efficacy of Immersive Virtual Reality as a Treatment for Clinician Burnout

With up to 50% of physicians in the United States facing some aspect of burnout during some point in their careers, clinician burnout has become a huge concern among the public over the last few years. Not only does this issue affect the mental well-being of hospital employees, but the increased stress and anxiety associated with burnout has also been shown to impact the quality of patient care and safety. As a result of these consequences, a variety of techniques are currently being researched in hopes of reducing these rates. This study aims to achieve a similar goal by assessing the efficacy of immersive virtual reality (VR) as a technology-based intervention for clinician burnout. Using a mixed-methods design with quantitative and qualitative components, the quantitative portion grows on secondary data derived from a previous feasibility study conducted in 2018 at the GW Emergency Departzment. In this continuation, volunteer clinicians were recruited from the Emergency Department at Cedars-Sinai, where the experimental group was offered 10-minute virtual reality shift breaks featuring various immersive modules. The resulting levels of burnout both pre- and post-module were then compared to one another and to a control using customized assessments based on the Oldenburg Burnout Inventory and Maslach Burnout Inventory. Data for this arm of the study is currently being collected. Once the results are obtained and analyzed, the outcomes will determine the types of participants selected for the qualitative component of the study. These participants will then partake in a semi-structured interview to describe their experiences, reactions to the intervention, and why they felt that it did or did not work. Coupled with the quantitative data, this information will hopefully identify any barriers or facilitators to future adoption and pave the way for VR as an effective, viable intervention for clinician burnout.

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Conducting the White Coats for Black Lives Racial Justice Report Card at The George Washington University School of Medicine and Health Sciences

Racial health disparities are pervasive in both the United States and the District of Columbia, where people of color statistically have less access to quality care and poorer health outcomes. While GW SMHS has demonstrated a strong commitment to public health over the years, many students have sought increased accountability on the part of the institution to commit to explicitly anti-racist policies, practices, and curricula. To identify areas for improvement through an evidence-based approach, a group of GW medical and PA students collected data on GW using the White Coats for Black Lives' Racial Justice Report Card, a standardized, national scoring tool aimed at encouraging U.S. medical schools to "take seriously their responsibility to fight racism in medicine." These students collected statistical data, conducted interviews with administrators, and coordinated on-the-ground curricular analyses of GW in order to complete the 14 metrics of the report card. Examples of the metrics include, "Under Represented Minority Student Representation," "Anti-Racist Training and Curriculum," and "Marginalized Patient Protection." After six months of research and data collection, the students concluded the report card analysis. On a scale from A+ to C-, GW was given a score of B-. Our poster presentation will discuss the findings of the report, describe the students' experience of conducting the research, and identify ways in which GW can better embody anti-racism in medical education.

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Introduction of formative assessment tool in a post-graduate training program in India: a mixed methods evaluation

BACKGROUND: Formative assessment is a teaching methodology intended to monitor student learning and provide ongoing feedback that can then be used to improving teaching and learning. Prior study regarding formative assessment in India has been limited. Our institution has longstanding partnership programs in Emergency Medicine (EM) education and training across India. In 2018, we introduced a new assessment methodology integrating an online formative assessment tool in addition to existing summative assessment. The aim of this study is to investigate the introduction of this formative assessment tool and its effectiveness for emergency residents training in India. Methods: 246 learners across 19 sites were given access to the question database with both planned guizzes and additional guestions. Usage metrics were monitored over the initial 12 months. Semi-structured interviews conducted in person with learners using a purposive sampling methodology. Learners were classified in two separate groups, based on post graduate year (PGY1, PGY2, PGY3), and based on utilizing of software (high utilizer, low utilizer, high performer). A hybrid thematic analysis approach was used to determine dominant themes from the interviews to identify any barriers to using the tool. Interviews were coded using NVivo. The study was deemed exempt by our institutional review board. Results: Overall, there was high variability among residents in the extent of utilization of the question database. PGY3s were found to utilize this educational platform significantly more frequently compared to PGY1s & 2s as indicated by a higher number of total questions answered (p < 0.001). Learners who used the database more performed better on summative exams as shown by the positive significant correlation between number of questions answered and the final exam score (r = 0.35, p < 0.001). Qualitative analysis showed that the majority of participants were motivated to learn for improved clinical knowledge and to be a good physician. The benefits of the formative tool included the relationship to clinical practice and a thorough explanation of answer choices. Disadvantages included unrelated topics to practicing in India and some topics being less covered than others. Participants defined success as passing exams and improved clinical practice. Conclusion: The integration of a formative assessment tool has provided positive outcomes for learners in EM education programs in India. Further development of the tool with locally relevant questions would be helpful, as well as identifying effective strategies for increased

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Utilizing Role-play in Teaching Medical Spanish

INTRODUCTION: There are 58.9 million Hispanics in the United States. This number makes up 18.1% of the nation's population and is expected to increase to 24.5% by 2050. Nearly 40% of Hispanic patients are categorized as having limited proficiency in English. Although interactive medical Spanish courses have shown efficacy in teaching field-related terminology, there are still significant barriers to implementing a medical Spanish curriculum. According to a national survey of medical schools in the United States, lack of time is the most frequently reported obstacle. Role-play may offer a time-efficient manner for students to learn Spanish and reduce this barrier. In our study, we investigated the potential benefit of roleplay in a medical Spanish course. Methods: Upon receiving approval by the Institutional Review Board, 19 incoming second-year medical students were recruited to participate. Based on their performances on a placement test composed of multiple choice and oral translations, students were assigned to either a beginner or intermediate group. The course consisted of one-hour weekly sessions for five consecutive weeks. During course sessions, students took the roles of a Spanish-speaking patient, an English-speaking provider, and an interpreter to practice scenarios that one may encounter when providing healthcare. The scenarios consisted of patients presenting to the emergency department, outpatient clinic, and inpatient hospital setting. At the end of the course, students took a post-course examination to determine if there had been an improvement in their Spanish language proficiency. Due to the non-normal distribution of scores, statistical analysis was performed using Wilcoxon signed-rank test. Statistical significance was determined using a p-value < 0.05. Results: Seven students, who were all members of the intermediate group, completed the course. Class attendance among this group was 77.40%. When comparing pre-course to post-course examination scores, there was improvement of scores in all categories. In particular, we found statistically significant improvement in oral translation of phrases from Spanish to English (p-value= 0.03). Conclusions: We investigated utilizing role-play as the central teaching method in a medical Spanish course. The cohort demonstrated statistically significant improvement in oral translation of phrases from Spanish to English, indicating an improvement in Spanish proficiency. More importantly, this was accomplished through a minimal time requirement of one hour per week, as limited time poses a barrier to implementing a medical Spanish curriculum. Such findings highlight the benefit of this teaching methodology and call for further evaluation in a larger sample size.

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HealthDesk - How a New "Health Pop-Up" Empowers a Community to Fight Health Disparities

Pop-ups are most accepted for providing visitors with timely, reliable, tailored information or services and have become virtually ubiquitous across industries. Consulting firms, IT startups, call centers and libraries all provide some level of customer support using this model. However, in an increasingly complex healthcare ecosystem, timely, reliable and tailored information is not consistently accessible, especially for patients from disadvantaged communities. For African American residents in Washington D.C. (primarily in Wards 5, 7 and 8), poor health outcomes are compounded by inadequate preventive care and low health literacy. Without access to the right information, residents often use high-cost resources such as the emergency department for low-acuity conditions. The HealthDesk design involved a joint partnership between The George Washington University (GW) and Pennsylvania Avenue Baptist Church (PABC). A previously successful grant-funded collaboration between GW and PABC proved that there was existing potential for the success of telehealth as a method of care access in Wards 7 and 8. Using a prototype ?train-the-trainer? curriculum, GW providers recruited members from the community (including PABC parishioners and other residents from Wards 5, 7, and 8) to serve as Digital Health Coaches (DHCs). DHCs were equipped to further recruit and train other members from the community to share the most reliable and up-to-date information available for residents to address pressing health concerns. Eight HealthDesk events were hosted from September to October 2019, with 240 residents receiving some kind of health-related assistance or assessment. The online resources provided to residents received 1,271 engagements. Questionnaires at the end of each resident visit assessed the likelihood of recommending HealthDesk using a Likert scale (1-10) to measure satisfaction. Visitors answered with an average score of 9.43 with a Net Promoter Score of 81. The majority of residents lived in Ward 7, and over 30% of fully registered residents completed a patient portal download for their regular healthcare provider. Information and resources regarding high blood pressure control and general healthy lifestyle choices were the most frequently requested at HealthDesk events. This study design that included input from both trusted community partners (e.g. houses of worship) and provision of intensive resource capacity (e.g. a local health system) attempted to maximize synergistic economies of scale. The ultimate goal was to leverage the networks of both GW and PABC to improve visibility of HealthDesk and solicit quick adoption by residents to improve care coordination.

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The Virtual Reality (VR) Guided Meditation Project: A Novel Way to Promote Mindfulness Among First-Year Medical Students

Medical student burnout is a well-documented phenomenon. Enhancing mindfulness through meditation can promote wellness but providing mindfulness opportunities in an enticing, easily accessible way is a challenge. The VR Guided Meditation Project is a novel approach that offers students an engaging way to practice meditation and mindfulness. We invited first-year and second-year medical students to attend VR meditation tutorials at the George Washington University School of Medicine. Between October 2019 and February 2020, we hosted five in-person tutorial sessions. During these sessions, the participants were provided Oculus Go VR headsets that were equipped with a guided-meditation app and EEG biofeedback device. Participants were then paired with a peer or instructor to complete a list of tasks. A total of 24 students participated in the in-person tutorials. Mean age and gap years taken were 23.7 years (range: 21-29) and 1.2 years (range: 0-5), respectively. Of the participants, 14 (58%) identified themselves as male, 10 (42%) female (42%), 13 (54%) White, 8 (33%) Asian, and 3 (13%) Latino. The majority (14, 58%) had never used Virtual Reality technology before. When asked to describe their experience with mindfulness, five (21%) had "no experience", sixteen (66%) had "some experience", and three (13%) had "plenty of experience." Virtual Reality shows great promise for garnering immediate interest in mindfulness and meditation from a diverse group of medical students. VR and similar technologies should be leveraged as a way to promote wellness and increase student engagement with mindfulness in medical schools.

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Marketing Online Medical Education Resources in Sub-Saharan Africa

synDRME.org is funded as part of the Medical Education Partnership Initiative and seeks to aid schools in countries with limited resources. The website itself is a conglomeration of various free online sources, organized by subject. The synDRME team has also generated stand-alone courses, including several in basic science and clinical study, that may be taken in addition to, or in lieu of, the course at a student?s home school. These courses contain textbook information, informative guizzes, case-based exercises, and exams, and are helpful for students from these countries, whose medical schools often lack a particular specialty, therefore producing practicing general practitioners who lack any knowledge or experience in that specialty. This happens in large part due to the trend in post-colonial times, wherein many physicians who are educated in Africa emigrate to other countries due to the lack of opportunity for further training. The goal of the synDRME project is to improve international medical education in order to eventually effect change in the health status of the target populations. In this study a literature search was conducted to determine how many schools are found in each country in sub-Saharan Africa. A list of schools was generated and it was found that there are 167 health science programs in this region. Online searches were then conducted to determine contact emails for deans and faculty in order to market synDRME. Medical school websites were also analyzed for quality, ease of use, and already available online education resources. A synDRME team member is currently generating a method of tracking how many times someone accesses the synDRME website, to enable future analysis of the data. Sub-Saharan Africa carries 24% of the global burden of disease, but only 3% of the world's health workforce. By more effectively educating physicians, a healthier society in these countries can be actualized, while setting a precedent for developing countries in other parts of the world.

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Active Learning- An Effective Teaching Modality that Improves Audience Engagement

This project was designed to evaluate if the use of active learning techniques impacts evaluations of continuing medical education (CME). We defined active learning as any instructional method that engages the learner in the educational process. In CME active learning techniques have not been well studied. Information on how to use active learning was provided to all Grand Rounds speakers during the 2018-2019 academic year. Each session was rated as having implemented active learning fully, partially or not at all. Evaluations using a 5 point Likert scale were completed at the end of each session by students, residents and faculty. Of the 27 Grand Rounds included in the study, 8 fully implemented active learning techniques, 10 partially implemented and 9 did not implement at all. The most common technique used by the speaker was audience response. Other commonly used techniques were think-pair-share and case discussions. A total of 511 evaluations were collected. The sessions that fully or partially implemented active learning had higher scores on the evaluations in response to questions on efficacy of teaching methods, understanding the topic and overall effectiveness of the presentation when compared to sessions that did not implement active learning at all using the Mann Whitney U test (p< 0.05). There were no differences in perceived expertise of the speaker(p > 0.05). The use of active learning techniques is viewed favorably by those attending Grand Rounds. Institutions should use active techniques to improve satisfaction with CME.

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Training medical students to prescribe lifestyle interventions using a Lifestyle Rx template: a feasibility study among medical students

Nationally, 39.6% of adults and 18.5% of children suffered from obesity in 2015-2016 according to 2017 CDC data. Obesity is a widely recognized contributor to several chronic diseases and decreased quality of life. Public health organizations have worked to develop resources to address these issues; however, previous research has noted that those who are the most physically inactive or consume the unhealthiest diets are unaware of these resources or unsure of how to instigate change. Rarely do individuals take initiative to ask their doctor about such resources, and many doctors do not routinely discuss these aspects of patients' wellness. In order to establish methods to inspire patients to discuss lifestyle interventions with providers and improve patient counseling in this realm, we aimed to educate medical students on how best to prescribe lifestyle interventions - including those aimed to increase physical activity, improve dietary habits, and enhance sleep and to determine the feasibility of allowing medical students to provide such prescriptions in a formalized manner. Given the generally accepted paradigm that students are allowed more time with patients than residents and precepting physicians, they are in a unique position to more deeply connect with their patients and therefore inspire them to take ownership of their care in order to achieve lifestyle changes. We hypothesized that formalizing an intervention through a written "Lifestyle Rx" prescription template would enhance students? confidence in facilitating these conversations and provide patients a sense of accountability to a written prescription. We created and distributed documents, including a Medical Student Handbook, a Patient Packet, and a "Lifestyle Rx" prescription template, to all participants - third-year medical students on their Primary Care rotation and first- and second-year Healing Clinic students. Participants were asked to use these resources in discussions with patients and to subsequently complete a survey regarding their experiences with the resources. Future goals include submission for IRB approval and continued participant outreach. Results will be used to inform medical student education on Primary Care clerkships including Family Medicine, Internal Medicine, Pediatrics, and Geriatrics. With continued participant engagement and data collection, the "Lifestyle Rx" prescription template could become widely available to clerkship directors and medical students for use in lifestyle intervention discussions. The Medical Student Handout and Patient Packet developed through this study could serve as a model for future Lifestyle Medicine curricula.

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Improving the Interventional Radiology Medical Student Curriculum Through a Clinically Centered Rotation Experience

Due to the constraints of time, standardized workflow, and other administrative tasks on modern academic medicine wards, often patients may be left with significant questions or a poor understanding of procedures they will undergo. Often there is not an adequate addressal of these points during pre-procedural consent and patient education. As interventional radiology is a relatively new medical specialty, many patients do not have a good understanding of the field. Often IRs work in the inpatient setting and patients do not have exposure to their work until their services are needed. As IR grows as a field, it is shifting to becoming a more clinically oriented specialty that has greater patient interaction and direct management of patients. In order to best serve the public and patients in general, it is important that there is greater education provided to the public on what services IR can provide and what treatments are available. At the same time, it is critical to ensure that the next generation of IR providers are adequately trained to become well rounded clinicians rather than a simple proceduralist. Our project aims to learn more about the public's knowledge of IR, educate the public about IR, and educate students and improve their training in becoming clinicians.

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Salivary Gland Ultrasound Standardized Views: Improving Anatomic Identification in Residents

EDUCATIONAL OBJECTIVE: At the conclusion of this presentation, the participants should be able to compare the speed in which a resident can identify salivary gland structures on ultrasound before and after learning using a standardized view teaching method. Objectives: The objectives of this study were to determine the speed in which a resident can identify salivary gland structures on ultrasound before and after implementation of a structured ultrasound teaching method utilizing standardized views. Study Design: Five otolaryngology residents were timed in their identification and assessment of structures related to the submandibular (SMG), parotid (PG), and sublingual (SLG) glands. SMG structures included anterior belly of the digastric, mylohyoid, hyoglossus, and lingual vein for the SMG. PG structures included buccal fat pad, retromandibular vein, anterior border of the masseter, external carotid, and posterior border of the masseter. SLG structures included anterior belly of the digastric, mylohyoid, geniohyoid, and genioglossus. After a brief anatomical review of aforementioned structures, residents were timed on one side of the model (with structures being reported to and confirmed by a senior attending otolaryngologist with expertise in ultrasonography). They were then taught to use standardized views: "longitudinal submandibular gland view", "transverse parotid gland view", and "submental transverse view" for SLG, and timed on the opposing side of the model. Methods: The time to identification of the first side were measured and compared to the time to identification on the contralateral side after learning standardized views. Results: On average, when using a standardized view participants recognized SMG structures 61% faster, the SLG structures 66% faster, and PG structures 74% faster. Conclusions: Use of standardized views improves resident time to identification of salivary gland structures in the head and neck.

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Assessing Needs and Addressing Climate Change at Grand Rounds and Pre-clinical Curriculum: Knowledge, Attitudes, and Engagement

PROBLEM: Global climate change is described as the "greatest threat to global health in the 21st century". Academic medical centers will play a critical role in equipping clinicians to care for patients in a changing climate. The World Health Organization asserts healthcare professionals "have a duty of care to current and future generations" in the face of climate change. However, standard medical school curricula do not include this topic. The George Washington University School of Medicine and Health Sciences Internal Medicine Grand Rounds and the pre-clinical Patients, Populations, and Systems (PPS) course offer opportunities to incorporate climate change education to engage audiences at various stages of training and experience. Methods: The "Global Climate Change: Understanding and Responding to Impacts on Health" lecture provided an overview of climate science, a review of diseases with environmental drivers and how climate change impacts health and populations facing disproportionate risk. This lecture was given at Grand Rounds to 38 physicians and to 85 second year medical students PPS. Both groups completed a pre-lecture survey to evaluate baseline perceptions of climate change and its health impacts on. Results: 87% of Grand Rounds participants identified climate change as "extremely important" or "very important" and 76% were "very worried" about climate change. 73% of medical students identified climate change as "extremely important" or "very important" and 49% were "very worried" about climate change. 95% and 87% from Grand Rounds and PPS, respectively, agreed climate change will affect future generations "a great deal". Yet only 13% and 8% of Grand Rounds and PPS participants, respectively, felt "very knowledgeable" about the impact of climate change on health. 32% of Grand Rounds participants and 27% of PPS participants agreed it is directly related to patient care "a great deal". Conclusion: This module was the first of its kind at our institution. Since the majority of participants were "very worried" about climate change and few felt "very knowledgeable", this education was highly relevant. These results highlight the importance of education to equip physicians to engage with the effects of climate change on health. The health risks posed by climate change present an opportunity to engage a socially influential group in critical education, research, and advocacy work. Further exploration of perceptions and baseline knowledge of climate change impacts on health by career level and specialty would ensure medical professionals at all levels remain engaged and equipped to tackle this critical global challenge.

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Landscape Assessment of Global UNICEF Adolescent Mental Health Programming

Adolescence is a critical period between childhood and adulthood that has significant influence on later outcomes. However, many adolescents live in contexts of conflict, violence and humanitarian or health crises. Amid all these factors, mental health disorders represent a substantial portion of global disease burden in this key population. Self-harm and suicide are consistently among the top three causes of mortality during the second decade of life. Addressing adolescent mental health outcomes is a priority for many global non-governmental organizations. The United Nations Children's Fund Plan for 2018-2021 highlighted the importance of protecting the well-being of adolescents and emphasized the need for further education on adolescent suicide and mental health as a key emerging issue. This landscape assessment aims to contribute to this goal by documenting UNICEF's worldwide adolescent mental health programming in order to determine current strengths and weaknesses as well as identify opportunities for improvement and expansion. The assessment was conducted using qualitative interviews with key UNICEF informants and through analysis of UNICEF documents. Interviews covered all UNICEF regional offices worldwide as well as the relevant informants at Headquarters and on the Data Analytics team. Based on these initial interviews, key informant recommendations, and analysis of UNICEF documents, countries of interests were selected as case studies representing each region. An assessment of Adolescent Mental Health programming was completed highlighting successful program models and potential scalable interventions. Initial analysis foregrounded programming that leveraged social media platforms like text messaging, radio or podcasts as well as school-based approaches. Many countries were involved in active research to promote advocacy at a policy level and others were training health professionals. Regional differences in programming commitments and investments were multifactorial. Overall, however, health prevention and education was at the forefront emphasizing the necessity for continued research of how to reach the needs of adolescents worldwide.

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Experiences of Training Community Health Workers on Hypertension Prevention in Rural Uganda

Low-income countries are facing the double burden of communicable diseases and rising prevalence of noncommunicable diseases (NCDs). Traditionally, community health workers (CHWs) have played a significant role in the prevention and control of communicable diseases such as malaria, tuberculosis, and HIV. However, the involvement of CHWs in NCD prevention and control has not been fully explored, especially in many Low-and-Middle-Income Countries including Uganda. This direct participant observational study examines how well CHWs receive, comprehend, and engage with OmniMed's hypertension quarterly training . OmniMed is a non-profit organization working to reduce global health inequity through community education, sustainable solutions, and health volunteerism. CHW demographics and contacts were obtained from OmniMed; starting August 2019 CHWs were invited for a day-long training targeting hypertension risk factors such as the effects of high-stress levels and alcoholism. After each training, CHWs were assessed on their understanding of the topics and given the opportunity to ask questions and brainstorm solutions. Their responses were collated and used to cater future sessions to their goals, concerns, and knowledge-base. Since the implementation of trainings, 269 CHWs have been trained. Dialogues with CHWs demonstrated that they grasped the effects of diet, alcohol, and stress on blood pressure and agreed that these three rampant risk factors existed in their villages given the state of widespread poverty. From these dialogues emerged three key themes which affirmed the CHWs comprehension and engagement with the training material. First, CHWs provided further points of discussion on the causes of hypertension and frequently brought up other chronic NCDs like diabetes and their relationship to hypertension. Second, they provided insight into some of the physical and mental health misconceptions within their communities. For example, some CHWs seemed to think that certain home-brewed alcohol is "good for you" so we have tried to clarify this by dispelling the misconception and educating them on the health consequences of all kinds of alcohol. Third, they have demonstrated a willingness to spark change for improved health outcomes through education and health promotion measures. Relatedly, CHWs suggested that male CHWs should talk with male community members and female CHWs with female community members to promote a more trusting environment with sensitive topics. After the training, CHWs exhibited greater confidence in their understanding of hypertension and desire to prevent and control it within their communities. Future training for CHWs should consider providing a broader package of information beyond hypertension to cover more NCDs.

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Variation in Rates of Intentional Ingestion of Substances for Suspected Suicide Attempts and Substance Abuse Based on Age Among Us Adolescents and Adults

1 in 5 children and adolescents in the United States have a diagnosable mental illness. In 2017, suicide rates for adolescents (ages 15-19 years) increased to the highest point since 2000. Drug overdoses have been rising since 1999, and overdose deaths among those ages 15-24 years of age reached the highest rate in 2017 since 2011. This study sought to examine differences in trends in suicide attempts and substance abuse via intentional ingestions in US adolescents and adults from 2007 to 2017. The American Association of Poison Control Centers publishes annual reports that are publicly available online with de-identified information reported across all Poison Control Centers in the US on human poison exposures. Aggregate data were obtained from 2007-2017 Reports on the number of cases for intentional ingestions for suspected suicide and substance abuse among people ages 6-12, 13-19, and =20 years. A one-way ANOVA was conducted twice to determine significance between the 3 age groups for suicide and substance abuse rates. A total of 9033 cases were reported from 2007 to 2017 for ages 6-20 years for suspected suicide and substance-abuse exposures. Excluded were 24 "unknown age" cases. For suspected suicide cases, there was a significant difference between the 3 age groups (p < 0.001) with the highest rate among those ages =20 years followed by those ages 13-19 and then 6-12 years. Suspected suicide rates were steady for each age group from 2007 to 2017. For substance abuse cases, there was a significant difference in trends between the 3 groups (p < 0.001), with the highest rate observed among those =20 years of age followed by those ages 13-19 years and 6-12 years. Substance abuse rates for =20 years increased from 2007 to 2012, dropped to the lowest in 2013, and then increased from 2014 to 2017. Rates for youth ages 13-19 years decreased from 2007 to 2012, reached the highest point in 2013, and then decreased from 2014 to 2017. Rates were steady among youth ages 6-12 years from 2007 to 2017. Substance abuse rates are rising in those =20 years old but declining for those ages 13-19 years. These results prompt us to focus on adults for substance use prevention interventions. Although substance abuse trends show a decline in those 13-19 years, suicide rates via ingestion remain steady, demanding scrutiny of the current health delivery system in prioritizing this group for screening and suicide prevention.

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Quality Improvement

"Headache" Online Information: An Evaluation of Readability, Quality, Credibility and Content

Headache is one of the most common disorders of the nervous system. According to the WHO, nearly half of the adult population had a headache at least once during the past year. The aim of this study is to evaluate the quality and health literacy required to understand information regarding headaches found online and to compare these metrics between different websites. In this study, we searched the term "headache" across four popular search engines and examined the first 30 results on each engine. Next, we assessed the readability of these websites using SMOG and Flesch-Kincaid tools. We then examined them for completeness of content based on 11 criteria created by our team. We also used the JAMA benchmark tool to evaluate the credibility of online information and the DISCERN tool to assess the quality of online information on treatment of a health problem. The two scales used to evaluate readability of online health information about headache are generated using separate formulas and estimate the average number of school years needed to understand a piece of writing. These scores ranged from 5.6 to 17.3 using SMOG with a mean of 10.20, and ranged from 6.3 to 22.1 using Flesch-Kincaid with a mean of 11.46. The values above denote that, in order to comprehend most of the material, one needs the reading ability of at least a tenth grader. Only four websites had a readability score below an eighth grade level. When evaluating the reliability of online health information using the JAMA benchmark, only three websites fulfilled the four criteria. Many of the websites failed to provide citation or authorship, and only 17% provided disclosure of any conflicts of interest. The websites did fairly well in providing the date in which information was posted or updated, with 79% compliance. The checklist we used to assess the completeness of content brought attention to their lack of information on prognosis and prevention. The websites did well, however, in providing information on the types and causes of headache. When assessing quality of treatment information using the DISCERN tool, the mean score generated was 41 on a scale of 15 to 80. Based on previous studies, this score would be classified as "fair". These findings highlight shortcomings in the readability, quality, credibility and content of online information available on headaches and offer specific areas which can be addressed to improve health literacy and patient outcomes.

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Quality Improvement

Survey on Pediatric Disaster-Related Critical Care Surge Management

BACKGROUND: Disaster medicine literature points to both reverse triage and the temporary expansion of critical care and intermediate care capabilities as strategies for increasing pediatric disaster-related critical care surge capacity. A survey was created to determine staff interest and opinion of these strategies at Children's National Hospital. METHODOLOGY We utilized a REDCap survey, using a 1 to 5 Likert- type scale (1= not at all, 2= slight, 3= fair, 4= moderate, 5= high) to assess individual staff and unit/department interest and opinion on: 1) disaster critical care surge readiness, 2) reverse triage and temporary intermediate care units, 3) critical care needs of selected patient presentations, and 4) selected pediatric mortality risk scoring systems. RESULTS There were 154 participants composed of physicians, registered nurses, and respiratory therapists. The mean rating of individual and departmental disaster critical care surge readiness was 2.92 and 3.03, respectively. The mean rating of the usefulness of reverse triage criteria as a clinical decision-making tool and communication tool was 4.39 and 4.44, respectively, with the lowest rating by physicians and nurse practitioners of the Critical Care Medicine Division (n= 18, mean 3.94 & 3.78). The mean rating of usefulness of a temporary intermediate care unit was 4.09. Of selected patient populations, participants rated "Established tracheostomy on stable baseline home ventilator settings" with the lowest need for critical care monitoring during disaster surge with a mean of 1.90. CONCLUSION The survey results imply that there is staff and departmental interest in further investigating the use of reverse triage and temporary intermediate care units as strategies to address disaster-related pediatric critical care surge.

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Workforce Issues in Pediatric Ophthalmology

The fate of pediatric ophthalmology may be in jeopardy. For the past 20 years, there has been declining interest in the field compared to other subspecialties in ophthalmology, as fellowship positions and jobs remain unfilled. Of those fellows who do match in pediatric ophthalmology and strabismus, many are international medical graduates who often return to their native countries to practice, further diminishing the supply of pediatric ophthalmologists in the United States. In previous surveys, resident graduates have expressed disinterest in the field, reluctance to work with children, inadequate reimbursements, and insufficient interactions with faculty as reasons not to pursue this subspecialty. Millions of people throughout the United States do not have access to pediatric ophthalmologists, highlighting the issue of unequal distribution. As more pediatric ophthalmologists retire, there is concern that there will not be enough providers to meet the demands of this subspecialty. Although many of these factors deterring residents from entering this field have been resolved, the major issue of financial reimbursements has not been adequately addressed.

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Global Health

Role of Midwives and Holistic Care in Outcome of Long Term Women's Health

In the developed world, our present-day society heavily relies upon obstetricians for information and access to prenatal care, family planning and abortion care. Due to the advances in technology and the development of modern, sophisticated medicine, our society tends to forgo traditional belief systems and the holistic, integrative approach to medicine. This student's research focused on the integrative practices traditional midwives and doulas use to improve maternal and fetal health outcomes in Mexico and the U.S. Prior research has demonstrated that midwives' more holistic approach to prenatal care reduces stress and decreases the need for emergency procedures amongst pregnant women, while a lack of coordination of care across providers is associated with adverse outcomes for women and newborns. The overall objective was to gain an understanding of how traditional methods and standardized medical practices are integrated to deliver enhanced medical care and emotional, mental, spiritual and physical support to women and children in both Mexico and the United States. While the government of Mexico has a universal approach to healthcare, offering every citizen some form of access to standardized, modern healthcare, the use of midwives or "parteras" is commonplace, and even remains a first line service of choice among some communities. In the United States, midwives and traditional methods have been seen as antagonistic to modern medical care, though there has been a recent push to integrate the approaches. This student was able to observe the integrative systems of parteras in Mexico, obstetricians in Mexico and the United States, and healthcare providers, specifically doulas, at a family planning clinic in the US. This presentation aims to provide an overview of existing literature on the means of integrations across healthcare sites in the United States and Mexico that showcases research observed and obtained over the 8 week summer period. This was achieved through a systematic search of PubMed for literature published, site visits, shadowing, and observational studies and interviews with health professionals in Mexico and the US. The majority of studies reported that integration of traditional and medicalized techniques leads to healthier long-term maternal-child outcomes. The best method to increase quality and access to emotional, mental, and full-body support is the integration of care. While access to and coordination of a variety of providers is high in Mexico, there are still many barriers to quality integration of care in the United States.

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Telehealth at Faith-Based Organization: Pilot Program for Wards 5,7, and 8

Despite recent advancements in medicine, racial and ethnic health disparities have undermined our current health care system. Specifically, in Washington, D.C., African American residents are significantly more likely than their white counterparts to suffer from complications of non-communicable, chronic disease processes such as coronary heart disease, hypertension, and diabetes. Compounded by a lack of preventative health care services and poor health literacy, morbidity and mortality outcomes have negatively impacted the Washington D.C. community. To address these disparities, a telehealth education campaign was implemented to specifically target health care challenges for African American residents in Washington D.C. living in Wards 5,7 and 8. The program represented a partnership between The Pennsylvania Avenue Baptist Church and The George Washington University Medical Faculty Associates. The main goal of the program was to increases the health literacy and digital health literacy for disease processes such as hypertension, obesity, stroke and diabetes. To accomplish this, churches and volunteers were recruited and trained to build pop-up kiosks at community events throughout Wards 5,7 and 8. Physicians, medical students, and community volunteers specifically discussed how technology applications on smartphones and laptops can help residents be more proactive regarding their own preventative health care. The number of sessions held, the attendance of residents, and the utilization data of technology applications were examples of metrics and milestones that were recorded. From the initial 8 sessions hosted, 240 residents most commonly from Wards 5,7,8 and Maryland participated in the exercise. A total of 71 technology applications such as patient portals were downloaded. In addition, a total of 44 residents benefited from phone optimization services such as setting up medication alarms or Medical IDs on their smart devices. The initial data showcases the promising potential of technology applications to empower residents to improve their self-management and prevention of diseases. It also showcases the potential for increasing the usage of telemedicine services in underserved regions to increases the accessibility of healthcare. To make the initiative more sustainable in the future, a long-term partnership with churches in Wards 5,7 and 8 needs to be established. In addition, a larger promotional campaign needs to be in place to reach out to more residents who may benefit from these services.

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An Examination of Data from 700 Crashes Involving Mopeds and Scooters in Washington, D.C., from 2016 to 2019

INTRODUCTION: Dockless electric scooter companies allow individuals to rent a lightweight motorized vehicle on-demand, without the need to return it to a designated station after use. The first dockless scooters arrived on the sidewalks of Washington, D.C., in March 2018. Since then, companies offering access to shared, dockless scooters have increased their presence in D.C. and across the country. Currently, 5,235 dockless scooters operate in the District, and the District Department of Transportation (DDOT) is considering increasing the number of permitted scooters to 10,000. As DDOT considers this rapid expansion, it would be prudent to assess how the addition of these vehicles has impacted collisions and subsequent injuries. Notably, fractures, head injury, and soft tissue injuries are commonly associated with the use of electric scooters, and the low rate of helmet use among riders of these vehicles increases the risk for traumatic brain injury. Methods: We gueried two datasets published by the Metropolitan Police Department (MPD): Crashes in D.C. and the corresponding Crash Details Table. Records between these two datasets were matched using the corresponding CRI-MEID field. Crash reports filed between 01/01/2016 and 12/31/2019, and noted to involve a "moped/scooter", met our inclusion criteria. Results: Of the 106,400 crashes reported by the MPD between 2016 and 2019, 700 involved a "moped/ scooter" and thus met our inclusion criteria. Between 2016 to 2018, an average of 156.67 crashes each year involved a moped/scooter. In 2019, 230 crashes involved a moped/scooter, a 31.30% increase from 2018. These crashes resulted in 97 minor injuries and 20 major injuries, representing a 19.59% and 45.00% increase from 2018, respectively. There has been 1 fatality reported each year between 2017 and 2019. Of the injuries and fatalities reported, the average age has fallen each year we assessed: from age 36.49 (SD=15.15) in 2016 to age 30.98 (SD=12.58) in 2019. 53 crashes occurred in Ward 2, representing the highest percentage in the District and a 45.28% increase from the data in 2018. Conclusion: In this study, we analyze the MPD datasets on crashes involving mopeds and scooters reported between 2016 and 2019. We show that in 2019, there was a notable increase in the number of crashes involving these vehicles and an increase in injuries. Importantly, incidents involving mopeds and scooters are counted together in the MPD Crash Details Table. The inability to isolate incidents involving dockless electronic scooters is a limitation of this study.

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Quality Improvement

Implementation of Point of Care Ultrasound in the Outpatient Setting

BACKGROUND: Point-of-care ultrasound (POCUS) has been increasingly integrated into the practice of emergency and critical care physicians. Using an ultrasound machine at the patient's bedside also improves the speed at which physicians are able to make a clinical diagnosis, which in turn hastens both initial treatment and disposition decisions. While POCUS is a core competency for all emergency medicine residents, other specialties have been slower to adopt it into clinical care. Objectives: POCUS is a great potential for in less acute care settings, such as in family medicine and primary care clinics. Specifically, POCUS can not only improve the sensitivity of primary care physicians in detecting illnesses, but also improves the specificity at which they do so. Our aim is to advance the use of POCUS in the primary care setting by reviewing six sonographic topics and demonstrating how they can be of immense assistance to the physician in the outpatient setting. Discussion: In this review, we discuss eight conditions including identification of foreign bodies, skin and soft tissue infections, gallstones, kidney stones, abdominal aortic aneurysms, urinary incontinence, placement of an IUD and ectopic pregnancies. The benefits of integrating POCUS into family practice are multifactorial and expanding as the precision and applicability of the technology advances. These range from the granular diagnostic benefits such as a higher degree of sensitivity and specificity for frequently encountered conditions, to the big picture benefits of reducing medical costs by implementing a low cost diagnostic exam as opposed to an X-ray or CT scan while not compromising level of precision. In today's world of rising healthcare costs, cost-effective care is increasingly relevant. Additionally, ultrasound is a safe imaging option compared to CT or X-ray, as there is no ionizing radiation exposure. Finally, POCUS is a broad scope tool that can provide additional information to primary care physicians when making decisions about referrals, screening procedures, and general health checkups. Conclusion: The integration of POCUS into the outpatient setting has the potential to provide physicians with incredibly useful bedside information to help with diagnostic decision making and expedition of medical treatment.

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Community and Urban Health

Safe Sleep D.C.

Rates of sleep-related infant deaths remain largely unchanged despite recommendations from the American Academy of Pediatrics (AAP) and both national and local safe sleep campaigns. The link between unsafe infant-sleep practices such as nonsupine positioning and bed-sharing and sleep-related infant deaths has been well studied, however, caregivers do not always follow safe sleep recommendations. D.C. has one of the highest infant death rates in the nation, with remarkable regional variation in infant deaths. Between 2012-2016, Wards 7 and 8 in Southeast D.C. accounted for approximately 50% of total infant mortality within the District. Rates of infant death in these wards range from 9.3 to 14.6 per 1000 live births, which is almost seven times higher than rates in Wards 2 and 3 and almost three times as high as the national average. Beyond an understanding of regional difference, it is also important to better understand why caregivers choose to follow or ignore safe sleep guidelines. Previous research has demonstrated difference in perceptions of safe sleep practices among different cultural groups. In addition, one-fifth of Sudden Infant Death Syndrome (SIDS) deaths in the United States occur when the infant is in the care of a child care provider. The understanding and motivation to follow safe sleep guidelines in these populations, however, is less well understood. The Emergency Department (ED) at United Medical Center (UMC) in Southeast D.C. primarily serves patients from Wards 7 and 8. Chart review at this institution revealed that of sudden unexplained infant deaths presenting to Children's National Medical System (CNMC), 60% have an unsafe sleep environment as a contributing factor to their death. While only 23% of our total infant visits take place at the UMC campus (compared with CNMC Sheikh Zayed campus), 38% of infant deaths occur at the UMC location, highlighting the burden of death on the nearby community. Few studies have investigated regional differences behind beliefs and barriers regarding safe infant sleep. It is therefore imperative to better understand barriers and beliefs to develop effective interventions to improve safe sleep. The purpose of this study was to identify perceived barriers and facilitators and provide education and resources regarding safe sleep to families. The specific objectives were: (1) to understand caregivers' experiences with safe sleep practices; (2) to explore caregivers' beliefs regarding safe sleep and co-sleeping; (3) to provide safe sleep education through researcher contact with study families. Survey results and analysis are in progress.

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An Open Source, Vender Agnostic Hardware and Software Pipeline for Integration of Artificial Intelligence in Radiology Workflow

BACKGROUND: Although machine learning (ML) has made significant improvements in radiology, few algorithms have been integrated into clinical radiology workflow. Complex radiology IT environments and Picture Archive Communications System (PACS) pose unique challenges in creating a practical ML schema. However, clinical integration and testing are critical to ensuring the safety and accuracy of ML algorithms. Purpose To propose, develop, and demonstrate a simple, efficient, and understandable hardware and software system for integrating ML models into the standard radiology workflow and PACS that can serve as a framework for testing ML algorithms. Methods A Digital Imaging and Communications in Medicine/Graphics Processing Unit (DICOM/GPU) server and software pipeline was established at a metropolitan county hospital intranet to demonstrate clinical integration of ML algorithms in radiology. A clinical ML integration schema, agnostic to the hospital IT system and specific ML models/frameworks, was implemented and tested with a breast density classification algorithm and prospectively evaluated for time delays using 100 digital 2D mammograms. Results An opensource clinical ML integration schema was successfully implemented and demonstrated. This schema allows for simple uploading of custom ML models. With the proposed setup, the ML pipeline took an average of 26.52 seconds per second to process a batch of 100 studies. The most significant processing time delays were noted in model load and study stability times. The code is made available at http://bit.ly/2Z121hX. Conclusion We demonstrated the feasibility to deploy and utilize ML models in radiology without disrupting existing radiology workflow.

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Quality Improvement

Comprehensive Postpartum Care: Assessment of Varying Provider Practices and Patient Experiences

INTRODUCTION: Women experience challenges that affect their health and their ability to care for their infant during the postpartum period. Up to 40% of women do not attend the initial postpartum visit. We investigated how different types of providers manage postpartum education and assess current patients, concerns, and challenges of the postpartum period. A prenatal assessment that identifies postpartum concerns could help providers develop individualized care plans that improve postpartum care. Methods: Patients at a major urban OB/GYN clinic were recruited for an IRB-waived voluntary survey. Descriptive statistics, chi-squared tests, and odds ratios were used for analysis. Results: Among the 250 women in their 3rd trimester, there were high levels of concern regarding breastfeeding (59.2%), experiencing "baby blues" (50.0%), and losing pregnancy weight (50%). However, only 52.4% reported discussing plans to feed their baby postpartum with even less discussion on other important postpartum topics such as challenges they might experience (30.0%), physical activity (20.4%), and losing pregnancy weight (12.0%). Reported discussions regarding postpartum care by type of provider were statistically significant, with midwives less likely to discuss a postpartum care plan than medical doctors (OR .10; 95% CI 0.05-0.20; P<.001). However, patients reported midwives were as likely to discuss postpartum challenges (P= .9565). Conclusion: Patients expressed postpartum concerns but less than half report discussions with providers on aforementioned topics. The likelihood of reported discussions regarding postpartum care varied by type of medical provider, which highlights the potential benefits of multidisciplinary collaboration. We suggest that a standard 3rd trimester survey might improve postpartum care plans.

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Digital Health

Evaluating the Efficacy and Feasibility of Telemedicine Use in Pediatric Obesity Medicine

Telehealth has been successfully implemented in the management of adult obesity. Given the many obstacles to pediatric weight management, including time, finances, and distance to programs, the use of telemedicine in both rural and urban communities has been utilized to deliver comprehensive pediatric weight management care. This review examines all studies in the past decade that employed real-time telehealth communication directly between families and obesity specialists to treat pediatric obesity. In order to comprehensively evaluate the efficacy of practical use of such programs, studies that surveyed family satisfaction with this method of health care delivery are also included. All of the studies included demonstrated non-inferiority in clinical efficacy as measured by weight status improvement in participants of either the telehealth cohort or the in-person cohort. Attrition rates were also not statistically significant between groups. However, patient satisfaction with telemedicine delivery was high across studies. Lack of statistical significance in outcomes of these studies can be attributed to infrequent visits, limited duration of programs, and study size. Future studies are needed to further assess the effect on health outcomes as well as compliance when direct-to-consumer telemedicine visits are integrated in pediatric weight management clinics. This method of telemedicine would allow for more frequent contact with patients and families in between face-to-face encounters. Telehealth provides increasing potential to create a more robust, accessible, and effective pediatric weight management programs.

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Global Health

A Narrative Review on the application of Near Infrared Spectroscopy in the Setting of Free Flap Monitoring

BACKGROUND: Plastic microsurgeons in Cali, Colombia provide a great service to those who need reconstructive surgery, and a primary surgery they perform is the free flap transfer. A free flap transfer is the translocation of tissue from one part of the body to another to address an existing deficit. In order to successfully install a free flap, blood vessels of the flap must be severed at its original site and reattached at the new site. A key concern in these surgeries is that the reattachment site has a clotting risk, which will result in the loss of the flap. These concerns are compounded in Cali, where many of these surgeries are in a trauma setting. Flaps with thromboses can be salvaged, but early detection is essential. The current standard of care for post-operative monitoring has low salvage rates. However, there is much innovation in this field to increase detection rates of clotted flaps. Of the many monitoring methods used, near-infrared spectroscopy (NIRS) is proving to be very effective at increasing early detection of thrombi within the flaps, subsequent surgical intervention, and flap salvage. Objective: Dr. Maria Isabel Cadena and her surgical team in Cali, Colombia are interested in understanding the literature in using NIRS in free flaps, especially in post-trauma and lower extremity settings. The purpose of this research was to find current literature on the utilization of NIRS in the monitoring of free flaps to verify its applicability for Dr. Cadena's team. Methods: Performed a keyword search for NIRS systems on Pubmed, and observed free flap surgeries in Cali, Colombia. Results: Currently, there are few publications in regards to the usage of NIRS in free flap monitoring, but the results are very positive in the literature. Recent studies show that NIRS is effective and easy to use. In one study, NIRS increased salvage rates of free flaps with thromboses from 57% to 96%, which signifies a major increase in salvage. Conclusion: Based off of the research in this narrative review, the evidence overwhelmingly supports using NIRS when monitoring free flaps. The limitations of this research is most findings were in developed economies in non-trauma surgeries of central and upper extremities, whereas Dr. Cadena often reconstructs lower extremities from traumatic events. NIRS is effective in the free flap setting, but more research should be pursued within its use in lower extremity free flaps as well as in trauma settings.

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Digital Health

Apple Watch, Wearables, and Heart Rhythm: Where Do We Stand?

Atrial fibrillation (AF) poses a major health concern in the United States by affecting over 5 million people accounting for at least 15% to 25% of strokes. It can be asymptomatic or subclinical with its first presentation being stroke in 18%, and AF being only detected at the time of stroke. With evidence of subclinical AF associated with increased risk of ischemic stroke, recent developments indeed point towards wearables, especially smart watches, being quite effective and representing a novel method for screening for silent AF in the general population, and thereby reducing mortality and morbidity associated with it. This manuscript aims to review whether the photoplethysmography (PPG) technology, employed in the wearables to monitor heart rate, is accurate enough to aid in the diagnosis of AF that may remain asymptomatic or paroxysmal. It also explores the option of actually employing this method in the general population, the feasibility of this mode of diagnosis, sensitivity and specificity of this method compared to the conventional electrocardiogram (EKG), and the actual follow up with a practitioner and subsequent treatment of AF, if diagnosed. We conducted a Medline search using various combinations of "smart watch", "atrial fibrillation" wearables, and Kardia to identify pivotal randomized trials published before June 1, 2019, for inclusion in this review. Concurrently, major practice guidelines, trial bibliographies, and pertinent reviews were examined to ensure inclusion of relevant trials. A consensus among the authors was used to choose items for narrative inclusion. The following section reviews data from pivotal trials to determine the effectiveness of smart watch technology in detecting AF in the general population. Trials reviewed evaluated apple watch, Kardia, Samsung wearables in diagnosis of AF. The fact that there is an increase in consumer use of wearables, smart devices, which can serve as health monitoring devices that can be used as a non-invasive, ambulatory assessment of heart rate and rhythm, is definitely novel. Intermittent short EKG recordings repeated over a longer-term period produced significantly better sensitivity for AF detection, with 4 times as many cases diagnosed compared with a single time-point measurement. Since there are limitations and further research into this new field is required, the wearable technology may not serve as the ultimate tool for diagnosis of AF, rather a nidus for the general population to seek medical advice for confirmation on being notified of having an irregular rhythm leading to prevention of morbidity and mortality.

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Short-Term Outcomes of the Teen Promise Project: A Pilot Evaluation Study

Approximately 50% of all pregnancies in the United States are unintended. These pregnancies are linked to adverse maternal and neonatal outcomes. In the adolescent population, unintended pregnancies are particularly problematic. In Washington D.C., the teenage pregnancy rate is over double the national average at 18.1 per 1,000 pregnancies in 2016. These teen births overwhelmingly occur in the two poorest of the eight wards in the city: Ward 7 and Ward 8. To combat teenage pregnancy, numerous private and public sector organizations have implemented comprehensive sexual education and youth empowerment programs. However, evaluation research of these programs is nascent. The American College of Obstetrics & Gynecology (ACOG) launched the D.C. Teen Promise Project (TPP) to address disparities in sexual health education and reproductive health outcomes in D.C. The program provides middle school girls and boys with comprehensive sexual education. Uniquely, medical students administer the program and serve as youth role models for the students. This research project seeks to evaluate the short-term impacts of TPP on improving knowledge, understanding risk and importance, and improving self-efficacy on the path to improved sexual and reproductive health outcomes. Surveys were designed to highlight each part of the 8-week TPP curriculum. Evaluation study design is quasi-experimental using a single group pre-test post-test model. Results of a single post-test series show significant differences in outcomes among the topics surveyed. These pilot results suggest the need for further evaluation and research in order to fully understand the impact of the TPP program and the needs of reproductive health needs of adolescents in D.C.

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Impact of Health-Related Social Problems on Pediatric Emergency Department Patient Visits

BACKGROUND: Social determinants of health (SDH) such as childhood poverty, parental unemployment, and domestic violence are known contributors to pediatric morbidity, adverse childhood experiences, and poor adult health and achievement. Yet, these social issues are often addressed individually or not at all in healthcare environments. Addressing SDH during an emergency department (ED) visit may provide an opportunity to intervene and improve the health of our most vulnerable children. To our knowledge, no prior studies have attempted to quantify and identify predictors of high numbers of SDH in the pediatric ED setting. Objective: To quantify SDH and behavioral risk factors that affect patients and families visiting a pediatric ED and to identify healthcare-related conditions (obesity, frequent non-urgent ED visits, and/or poor asthma control) that may be associated with high numbers of SDH. Design/Methods: This is an ongoing cross-sectional study of caregivers of patients ages 0-12 years who present to a high-volume, urban, pediatric ED. Participants completed an electronic questionnaire designed to identify SDH within 13 domains. We performed multivariable logistic regression analyses to identify whether endorsing high SDH (=3) was associated with obesity (BMI percentile=90), frequent non-urgent ED visits (= 3 ED visits in 12 months), or poor asthma control as measured by the PACCI-ED caregiver survey. Results: 285 caregivers were approached, and 118 (41%) completed the electronic survey. Almost half of the caregivers reported SDH involving safety (40%) and/or parental or child mental health (39%). Nearly 1/3 identified housing risk factors. Issues around health care access (25%) and poverty (23%) affected approximately 1 in 4 families. A majority of caregivers (79%) screened positive for at least one SDH. Over onethird of participants (38%) screened positive for at least three (3) SDH. Endorsing high SDH was not associated with obesity (aOR 2.154, 95% CI: 0.590-7.871), frequent non-urgent ED visits (aOR 1.9, 95% CI 0.6-5.8), or poor asthma control (aOR 0.959, 95% CI 0.793-1.161). Conclusion(s): The majority of caregivers presenting for care to a pediatric ED endorsed at least 1 SDH, with one- third endorsing a large number of SDH. Future research will incorporate assessment of SDH in adolescents and their caregivers, further study predictors that will identify patients at high risk for SDH who may benefit from proactive social intervention, and assess the impact of social interventions on ED recidivism and other patient outcomes.

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Community and Urban Health

Impact of Health-Related Social Problems in Emergency Department Patient Visits

BACKGROUND: Health equity is defined by the Commission on Social Determinants of Health as "valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and healthcare disparities." However, no studies yet exist that comprehensively screen for social determinants of health in large, urban, pediatric emergency departments or identify patients at the highest risk for a large number of social risk factors who might benefit most from rapid interventions. Therefore, quantitative data on comprehensive health-related social problems known to contribute to pediatric morbidity were assessed in this study. These problems included the following domains: literacy, housing, education, food security, employment, income, [home] safety, access to health care, mental health, substance abuse, immigration, intimate partner violence, and legal issues. Objective: To quantify social determinants of health (SDH) and behavioral risk factors that affect pediatric morbidity and health equity within a pediatric ED. Design/Methods: This is an ongoing cross-sectional study within a high-volume, urban, pediatric ED of 1) caregivers of patients ages 0-12 years 2) pediatric patients who are 13 and older. Participants completed an electronic questionnaire designed to identify SDH within 13 domains. We performed multivariable logistic regression analyses to identify whether endorsing high SDH (>3) was associated with obesity, frequent non-urgent ED visits, or poor asthma control as measured by the PACCI-ED caregiver survey. Importantly, the patients were randomized to intervention of discussing their survey results in order to evaluate that impact on ED visit recidivism. Results: 400 caregivers were approached and completed the electronic survey. The top determinants that were reported included safety, parental or child mental health, and housing. The majority of participants also reported at least one SDH, and 1/3rd of participants endorsed 3 SDH. The highest reported SDH was safety, followed by mental health, followed by housing. Conclusion(s): SDH continue to remain an important contributor to pediatric morbidity and mortality. However, through screening SDH can be addressed and analyzed in order to reduce ED recidivism. Factors that affect this include implicit bias during conversations with patients and health literacy. Further research is needed to continue developing a model that effectively triages patients with high social burden and those who would benefit most from social interventions.

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Quality Improvement

Ethical Challenges Related to Low Acuity Emergency Department Visits

BACKGROUND: Non-urgent emergency department (ED) use accounts for approximately 15% of all ED visits in the United States, however within pediatric EDs, low acuity visits account for approximately half of all visits. While providers and systems have made multiple accommodations to adapt these volumes, these visits continue to contribute to ED overcrowding. Pediatric EDs have made adjustments to see patients expeditiously while keeping the principles of autonomy and beneficence in mind, but application of these principles may be more complex when applied to low acuity visits. Methods: In this study, we consider the principles of biomedical ethics (Autonomy, Beneficence, Non-Maleficence, and Justice) as they apply to low acuity pediatric ED visits. Results: Respect for Autonomy: In the setting of low acuity visits can be understood as patients choosing the setting in which they receive care. However, chronic use of EDs for primary care may have detrimental effects unknown by parents or quardians, arguably making their decision not fully informed. Beneficence: Though, on an individual level, beneficence involves providing excellent and timely medical care to all patients, those who use the ED for low acuity complaints miss many of the beneficial effects of primary care visits. Non-Maleficence: Low acuity visits to the ED often involve unnecessary/unjustified harm, in the form of unnecessary testing, additional painful procedures, and increased cost to families. Justice: Emergency departments and emergency healthcare personnel are limited resources that need to be distributed in a just and fair manner. Low acuity visits put an increase demand for those resources, while at the same time leading to increased disparities in care. Conclusions: Possible solutions to the problem of low acuity patients seeking care in ED revolve around 2 systems approaches: building additional infrastructure to respond to patient's needs, and improving communication between EDs and primary care offices.

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Community and Urban Health

Type 2 Diabetes: Adherence to Evidence-Based Guidelines at a Student-Run Free Clinic

Student-run free clinics (SRFCs) often serve as safety-net practices for uninsured patients and offer medical students unique educational opportunities. Clinical guidelines can help medical students provide high-quality care. This study aims to evaluate the quality of diabetes management at a SRFC by measuring its adherence to the American Diabetes Association (ADA) clinical practice guidelines for laboratory evaluations. George Washington University's Bridge to Care is a medical student-run, attending-supervised clinic that offers free primary care and laboratory tests to uninsured adult populations in Prince George's County, Maryland. The authors conducted a retrospective chart review of clinical encounters from January 1, 2018 to June 30, 2018. Laboratory tests ordered at visits for patients with a diagnosis of type 2 diabetes (T2DM) were compared to tests recommended by the 2018 ADA Standards of Medical Care. The guidelines recommend a hemoglobin A1c (HbA1c) every three months and the following tests annually: lipid panel, liver function test (LFT), urine protein study, serum creatinine and eGFR, vitamin B12 for patients on metformin when indicated, and serum potassium for patients taking ACE inhibitors, ARBs, or diuretics. The percentages of patients who received appropriate and inappropriate laboratory evaluations were calculated. For example, if an HbA1c was ordered despite a documented HbA1c result within the three months prior, the encounter was marked as inappropriate laboratory evaluation per ADA guidelines. Of 376 encounters, 25% (91/376) were for patients with T2DM. ADA guideline-based care was not provided at 82% (75/91) of visits for these patients. Of the encounters that did not follow ADA guidelines, HbA1cs were ordered unnecessarily at 27% (20/75), and LFTs and urine protein studies were not ordered when clinically indicated at 47% (35/75) and 57% (43/75), respectively. Guidelines were best followed for lipid panels, serum creatinine and eGFR, vitamin B12, and serum potassium. These tests were ordered appropriately at 85% (77/91), 85% (77/91), 91% (83/91), and 91% (83/91) of all encounters for patients with T2DM, respectively. This study showed that patients with T2DM did not receive guideline-based care at 82% of encounters. On average, students under-ordered rather than over-ordered laboratory tests. Possible reasons for under-ordering include insufficient time for clinical reasoning in a fast-paced setting, focus on more acute complaints, or a lack of awareness of ADA guidelines. To address these barriers and improve the quality of care patients receive, we propose posting the ADA guidelines in the clinic and educating senior students that lead care teams.

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Global Health

Using Passive Sensing Data and Mobile Health to Improve Psychological Treatment for Depressed Adolescent Mothers in Rural Nepal

In Nepal, postpartum depression affects 1 out of 10 women, and suicide is the leading cause of death among women of reproductive age. Passive sensing technology is a way to collect data on the behaviors and activities of depressed mothers in order to better tailor psychological treatment and improve outcomes for postpartum depression. This study investigated (a) the feasibility and acceptability of wearable digital sensors with adolescent mothers and their families in rural Nepal and (b) the feasibility and utility of implementing this data into a phonebased application used by non-specialists to provide personalized psychological treatment. This study used a mobile phone and Bluetooth device to generate passive sensing data on aspects of a mother's life, such as amount of time spent with and away from the baby, movements and activities both inside and outside of the house, social interactions experienced, and physical activity. We then interviewed both depressed and non-depressed adolescent mothers who used these wearable digital devices and analyzed the ethicality, safety, social acceptability, utility, and feasibility of these technologies. This data was then used to develop StandStrong, a platform that collects passive sensing data to implement personalized depression treatment. Our results showed that both depressed and non-depressed mothers found it acceptable and feasible to collect passive sensing data. Depressed and non-depressed mothers expressed utility in having knowledge of their own movements and activities, as well as having information about their proximity to and interactions with their child. The non-specialized community counselors expressed utility in using the data collected from the wearable digital sensors to encourage behavioral changes during sessions and also to track the progress of patients between sessions. Barriers to using wearable digital devices included difficulty carrying the phone around throughout the day, privacy concerns, fear of loss or damage to the device, and concern about possible adverse health effects of the device. In summary, it is feasible and acceptable to use passive sensing data to tailor psychological treatment for depressed adolescent mothers in low-resource settings. This research demonstrates the effectiveness of mobile health technology in improving treatment and outcomes for postpartum depression in rural areas.

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Community and Urban Health

Barriers to Firearms Injury Research

INTRODUCTION: Firearm injuries and motor vehicle injuries are two leading causes of fatal injury in the United States, each accounting for 35,000 deaths annually. Research on firearm injuries is underrepresented when compared to research on motor vehicle collisions. Our objective was to identify perceived barriers to firearm-injury research compared to motor vehicle-injury research. Methods: This was a mixed-methods survey of corresponding authors of a minimum of one study, archived in PubMed, related to firearm-injury or motor vehicle injury (MVI) between 2014 and 2018. Electronic surveys included both closed and open-ended questions to assess barriers to research. We performed bivariable and multivariable logistic regression to identify differences in perceptions to barriers between the two groups. We performed qualitative analysis of free text responses through inductive derivation of themes. Results: Surveys were distributed to 113 firearm-injury researchers and 241 MVI researchers. The response rate was 42.5% from the firearm-injury researchers and 31.5% from the MVI researchers. After adjustment, firearm-injury researchers were less likely to cite institutional support (aOR 0.3; 0.1,0.8) as a factor contributing to their success, compared to MVI researchers. Firearm-injury researchers were more likely to report fear of personal threats (aOR 10.4; 2.4, 44.4) and experiencing personal threats (aOR 16.1; 1.6, 165.4). Thematic analysis revealed four themes: career, political, funding, and harassment. Conclusions: When compared to MVI researchers, firearm-injury researchers are significantly more likely to report limited support and threats as barriers to research. Further research to understand the impact of these barriers and methods to overcome them is needed.

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Health Policy

Intended or Unintended Consequences of Medicare's Merit Based Incentive Payment System (MIPS): Consolidation as a Requisite for Success

The uncertainty surrounding Medicare Quality Payment Programs (QPP) such as the Merit Based Incentive Payment System (MIPS) has forced many organizations to strategize on how to achieve success under value-based payment systems. Originally promised larger payment incentives than received, many provider groups are questioning the effectiveness of MIPS. With the goal of investigating these trends and their implications for public policy moving forward, a financial model was created to predict the extent of PI participation for organizations of varying sizes. This model specifically analyzed the feasibility of PI measures because they are among the most capital-intensive measures and thus most useful in elucidating group decision-making. Solo, small, medium, large, and very large practices were modeled using available data and final rules published by the US Department of Health and Human Services (HHS). The approximation of group MIPS performance under varying conditions was performed using quartile MIPS performance data generated from a sample distribution of approximate MIPS scores. We found that MIPS incentivizes performance proportionally, and as a result, the scale of operations is critical to the financial viability of compliance. Larger groups have a greater capacity to implement operational changes and make capital investments due to their financial leverage and advanced organizational structure. Large groups also likely have dedicated clinical leaders, more sophisticated electronic health record support, and contracts with experienced consultants to ensure maximal compliance with MIPS objectives. Small groups may not have the capital nor dedicated administrators to comply fully with MIPS objectives, placing them at a disadvantage. Rather than invest in technological solutions to advance their healthcare practice, smaller organizations are more likely to maintain financial viability through non-compliance. Our analysis demonstrates that current MIPS policy creates a "reverse Robin Hood" effect whereby larger groups gain additional Medicare revenue on the backs of smaller groups. These larger groups inevitably absorb smaller groups that cannot survive under these conditions, making MIPS policy a force of consolidation. It is conceivable that a long run goal of MIPS was to encourage consolidation so entities would be more responsive to policy changes in the future. Another goal may have been to encourage the creation of large entities capable of assuming financial risk in order to lower total Medicare expenditures. While the QPP value-based payment system is still in its infancy in the United States, current policy may also be incentivizing a provider market with less competition.

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Health Policy

Substance Use Disorder and Homelessness

Among the homeless, there are high rates of substance use disorders, primarily alcohol and illicit drugs. Homeless individuals face unique challenges when engaging in treatment for substance use disorders, which likely contributes to the high rate of treatment failure observed among this population. Features of homelessness that correlate with increased rates of treatment relapse include unstable living environment and a lack of social support. For these reasons, understanding and addressing substance use disorders and homelessness can have a significant impact on the availability and delivery of care to this population, and has the potential to improve outcomes. Through this research, it was shown that the management of substance use disorders is best understood through the chronic care model of illness. Establishing trust with a consistent treatment team is needed, and through the use of motivational interviewing and other behavioral strategies, the person will not only be more likely to engage in substance abuse services, but also more likely to sustain sobriety and recovery. Encouragement of participation in 12-step programs and faith-based groups will further a sense of community and facilitate the establishment of new social supports. Because of the magnitude and complexity of services that are needed, the ideal mechanism is to provide a "onestop shop", in which all of these services (clinical, social, and core) are offered in a single location. The Clinical services would offer primary care, mental health and substance use services at the same location. The substance use services would ideally include peer support counseling, group and 12-step options, preferably with contingency and/or reinforcement approaches. Naloxone should be offered as part of comprehensive treatment to any person at risk for opioid overdose. The Social services would facilitate education regarding criteria for various government aid programs, including housing options, how to obtain needed documents to apply for government programs, and how to apply for those programs. Core services would include space for showers, laundry facilities, computers, fax machine and telephone access, non-denominational chapel or meditation room, and emergency food pantry. Through this "one-stop shop" model, care is delivered in a patient-centered and coordinated fashion, which ultimately provides improved outcomes for the patient, and less cost for society as a whole.

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The Effects of Neighborhood and Individual Socioeconomic Status on Parental Engagement and Psychological Distress in the Neonatal Intensive Care Unit

BACKGROUND: Individual measures of socioeconomic status (SES) (e.g. education) are often used to study population health. In contrast, neighborhood-based SES measures provide a more sophisticated view of how community factors influence health outcomes. Prior studies suggest that higher individual SES is associated with increased resilience. However, no studies have ascertained the influence of neighborhood SES on parental engagement or psychological distress in the neonatal intensive care unit (NICU). Objectives: a) To determine the effect of neighborhood SES on parental psychological distress and parental engagement, b) To compare the effect of individual versus neighborhood SES on these relationships. Methods: Parents of neonates = 34 weeks gestation in the NICU (n = 45) were surveyed 2 weeks after birth (Table 1). Neighborhood SES was determined by calculating the "Concentrated Disadvantage" z-score (CDZ) from census tract data using the Association of Maternal and Child Health Programs' methodology. Parental education level and engagement in NICU activities (e.g. kangaroo care, pumping, calls/visits) were collected. Psychological distress was measured by validated scales (Parent Stress Scale-NICU, Connor-Davidson Resilience Scale, State-Trait Anxiety Inventory, and Edinburgh Postnatal Depression Scale). Statistical analysis by Spearman correlation and regression was performed. Results: Higher parental CDZs (more disadvantaged) were associated with lower birthweights (r = -0.41), increased resilience (r = 0.32), decreased anxiety (r = -0.38), and decreased stress from the infant's appearance (r =-0.35). Parents with higher CDZ and lower education participated less in NICU activities but called more frequently (Figure 1). Parental education and psychological distress were not correlated. In regression analysis, those with higher CDZ had double the odds of high resilience scores (OR 2.43) (All p < 0.05). Conclusion: Although parents with low SES by both measures engaged less frequently in NICU activities, only neighborhood SES was associated with parental psychological distress. Specifically, the inverse relationship between low neighborhood SES and high resilience differs from previous reports of a positive relationship between individual SES and resilience. Community factors build a parent's resilience and influence how they cope with hospitalization more than individual factors. CDZ may be a better measure of SES than individual. self-reported measures.

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Quality Improvement

Parents of Children with Sickle Cell Disease are Interested in Preimplantation Genetic Testing

Preimplantation genetic testing (PGT) is a screening modality used in conjunction with in-vitro fertilization (IVF) to screen embryos for sickle cell disease (SCD) prior to transfer into the uterus. It may also be used as an option for parents to have another child who is a HLA subtype match for their SCD child. Minimal work has been done regarding educating parents about this useful technology. We created an educational handbook on PGT given to parents of children with SCD at hematology clinic visits. Out of 83 parents approached, 81% completed our survey at the end of their appointment that assessed their views on the material covered in the handbook. Only 24% of parents knew about PGT but when educated about this option through the handbook, 69% said they believe that PGT should be discussed at their first hematology clinic visit. Ninety-seven percent thought educating parents with SCD about PGT was important and 69% felt that this education should occur very early in their child's care. This study also demonstrated that cost could be a potential barrier to accessing PGT as a viable screening method. PGT should be emphasized by providers early on to educate parents and ensure access to this option.

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Global Health

The Development of a Global Health Dermatologic Surgery Training Program in Durban, South Africa

The annual incidence of malignant melanoma in South Africa is amongst the highest rates in the world at 4.76 per 100,000 persons overall and up to 19.2 per 100,000 in whites (Norval et al., 2014). While South Africa has the highest number of medical schools in Sub-Saharan Africa, surgical training for dermatologists has historically been limited. The Global Health Dermatologic Surgery (GHDS) Training Program was developed to provide dermatologic surgery curriculum and training to the registrars (residents), and consultants (attending physicians), at the Nelson Mandela School of Medicine (NMSOM) in Durban, South Africa. Every quarter over four years, one to two surgeons from the American College of Mohs Surgery would volunteer for one to two-week assignments. The volunteers provided attending oversight and supervision of the consultants and registrars. South African consultants and registrars were trained using a combination of didactic lectures and hands-on pigs feet training to replicate an Accreditation Council for Graduate Medical Education (ACGME) training curriculum. The trainees performed surgeries for four days while one day was reserved for didactics during the week. 17 volunteer surgeons (4 surgeons made multiple trips) taught and supervised a total of 21 registrars and consultants over the 15 trips between 2014-2018. 362 patients were evaluated and 387 procedures were performed. Of the 297 patients who followed-up at one-week, 216 (58.7%) had no complications at all. The most common complication was mild pain, as reported by 67 (18.21%) of patients, and mild bleeding/serosanguinous discharge, as reported by 30 (8.15%) of patients. 30 (8.15%) patients had infections of the surgical site as a complication. Infection was often anticipatory recorded and treated with antibiotics given patient's geographic limitations without classic signs or bacterial culture confirmation. On a 1-4 scale, the mean scores for both site appearance and site feel was 3.37, indicating the most patients were "satisfied" to "very satisfied" for their surgical site's appearance and feel at 1-week post operation. Short term dermatologic medical service trips, in which a visiting dermatologist provides care to an underserved group for a short period of time, provide poor long-term outcomes and may not be cost-effective. However, long-term educational programs with a focused clinical scope may establish cost-effective long term means of improving care.

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Expedited Partner Therapy for Adolescents in Southeast, D.C.

Adolescents in South East, D.C. have unique challenges regarding access to sexual healthcare, understanding of care, and attitude towards receiving care. Lack of access to healthcare is associated with increased rates of chlamydia, gonorrhea and trichomonas. Expedited Partner Therapy (EPT) is a potentially useful clinical tool in treating adolescents in D.C. diagnosed with these sexually transmitted infections (STI). EPT improves access to care by providing healthcare to both the patient diagnosed with an STI and their sexual partner in one visit without needing the partner to be present. After showing potential in the adult population in D.C., there is a question of whether the same results can be applied to an adolescent group. This project addresses the need for more information about the effectiveness of EPT within this age group through information collected by community providers and patients in SE, D.C. The main objectives of this project were to survey community pharmacists filling EPT prescriptions and patients receiving EPT to assess how much information was known about EPT, how often EPT packets were delivered to partners, if partners attempted to fill the prescription, and any barriers that might have been encountered at the pharmacy. In addition, we aimed to improve provider usage of EPT in Children's National clinics by educating pharmacists through these interviews about the EPT law in D.C. and Maryland. To gain information about the usage of EPT from the pharmacist's perspective, we conducted interviews at 28 different locations in the D.C. and Maryland area. Pharmacists and community practitioners appear willing to incorporate EPT into their practice. Although many do not receive many EPT prescriptions, they were generally aware of the process and had been exposed to it in some way. To gain information about the usage of EPT from the patient's perspective, we called patients seen in SE, D.C. clinics. We contacted 29 adolescents in the course of the project who had been given EPT for positive chlamydia diagnoses. Of those, 20 had given the packet to their partners and 10 reported that their partners were able to successfully fill the prescription. Whether due to lack of information, urgency, or desire, the drop-off indicates that there is more work needed to be done to ensure that partners fill their EPT prescriptions.

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Health Policy

Validity of ICD Codes for Identifying Pediatric Injury

BACKGROUND: Accidental injury is the number one cause of death in children ages one through eighteen. Understanding how children suffer injury is a key part of planning and implementing effective public health interventions. Identification of injury for research purposes is primarily accomplished through identification of injury specific International Classification of Disease (ICD) codes. Little is known, however, about the validity or accuracy of these codes to identify mechanism of injury in children presenting to an emergency department. Objectives: The primary objective of this study is to explore the relationship between mechanism of injury as documented by ICD-10 code and mechanism of injury as determined by chart review. A secondary objective is to perform an epidemiologic survey of mechanism of injury presenting to a pediatric emergency department. Methods: This is a retrospective cohort study of patients aged 1-18 who presented to the CNH Emergency Department with a chief complaint of injury from July 1, 2018 through July 15, 2018. Patient were identified by chart review of all patients presenting during that time period. Cases where the cause of the injury could not be ascertained based on chart review were excluded. Mechanism of injury was determined by ICD code documented and by chart review. We will perform Cohen's Kappa between ICD code and chart review for each category of injury mechanism to assess for agreement. Results: Statistical analysis is still being performed on the data. We expect that the results of this study will improve the quality of the data used to inform prevention and mitigation strategies to enhance the delivery of emergency medical services, especially in the pediatric context. With better data, better decisions about where to focus resources and priorities can be made in order to have the most impact.

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Quality Improvement

Web-Based Quality of Life Data Collection: A Review in Radiation Oncology

Radiation oncology (RadOnc) providers regularly incorporate quality of life (QoL) assessments into their practice to assess treatment toxicities and late effects of therapy. However, routine QoL assessments may burden patients and providers and disrupt clinical workflow. Electronic QoL assessment systems mitigate obstacles to collecting and analyzing patient data, such as poor handling of paper forms, transcription errors, and lack of validation checks. Electronic collection systems provide an efficient and convenient means to the same end. In this abstract, we outline our method for designing and implementing a web-based QoL questionnaire and repository in our RadOnc clinic. Our institution provides Research Electronic Data Capture (REDCap) to easily build online surveys and databases. REDCap is a noncommercial, secure, and HIPAA-compliant web-based platform. Our clinic utilizes the EORTC Quality of Life Group's core questionnaire, the EO-RTC QLQ-C30 (QLQ30), and site-specific modules to assess QoL of patients who received treatment for head and neck cancer (HNC), endometrial cancer, and cervical cancer. The EORTC QLQ-H&N35 (H&N35) is a widely used tool to measure QoL in HNC patients and has been validated in large-scale studies. We recreated a version of both the QLQ30 and the H&N35 in REDCap. The project was designed using longitudinal data collection. Due to variations in type and frequency of patient encounters, we define events by patients' unique medical record numbers (MRN) and type of encounter. Combined with the assessment date, we can analyze patient encounters over time. A team member initiates patient encounters by accessing REDCap, providing the patient's MRN, and selecting the visit type. The project is designed with branching logic to queue a validation survey. We included this step to authenticate the response collection and to familiarize patients with the platform. The patient will then be presented with the QLQ30 and H&N35. The project was designed to reduce patient decision-making and effort. Along with branching logic, survey sections are displayed as matrices of fields and separated over different web pages when answer choices or response prompts change. This design was implemented to limit patient confusion and promote data quality. Data validation techniques are also employed to ensure appropriate completion of each survey. Development of a simple and effective web-based platform for survey administration presents many challenges. The REDCap program facilitated this objective by enabling efficient administration of web-based surveys. The QLQ30 and H&N35 were foundational starting points upon which to expand our platform and assess other treatment sites.

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Quality Improvement

Predicting the Impact of a Mass Casualty Event Using a Discrete Event Simulation Model

Mass casualty incidents (MCIs) unpredictably disrupt normal hospital operations and severely strain emergency department (ED) resources. To develop a discrete event simulation (DES) model to estimate the impact of MCIs on pediatric ED dynamics. To develop and validate the DES model, we used both retrospective data from 2018 and direct observations of patient care processes between June and August, 2019. We used a 50/50 split of retrospective data to create separate derivation and validation cohorts and used the derivation data to model the frequency of patient presentations for each acuity level. We used the prospective observations to refine the DES model with granular duration-of-process data. Each observation was classified by process type, duration of that process, medical staff involved, and the acuity of the patient. We used Arena® software to create conditional probability distributions from the observed duration of each process as inputs to the DES derivation model for comparison against our validation cohort. We observed 1,157 patient care processes from all sections of the ED, including patients from every triage acuity level. All ambulatory patients underwent a pivot nurse screening as their first patient care process (N = 52 observations, mean 2.8 minutes, SD 1.6) and every patient in the ED underwent an initial provider evaluation (N = 186, 9.6 minutes, SD 5.6). Initial nurse screening was best represented by an Erlang distribution (parameters 0.7, 4) and the provider evaluation was best represented by the distribution 1 + Gamma (3.9, 2.1). For an MCI that brings a surge of higher acuity patients, patient through-put problems would be exacerbated out of proportion from the simple increase in ED volume. The rate of patients undergoing additional evaluation processes varied widely across acuity level (imaging tests were performed for 76.4% of the highest acuity and 4.5% of the lowest acuity patients). Discrete event simulation modeling was used to model the normal behavior of a complex system. Adding simulated resource-intensive patients can predict the impact and magnitude of a disruptive event such as an MCI. We will create computerized MCI simulations to estimate their impact and determine optimal emergency department resource allocation to minimize the adverse system effects of MCIs on other high acuity patients. We will use the model in future projects to optimize hospital resources for other complex system problems, including allocation of space for sedations and rearrangement of triage during periods of surge related events such as widespread viral infections.

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Health Policy

Advancing the Research in Advance Directives: A Literature Review of Randomized Controlled Trials Examining Advance Directives in the Emergency Department

BACKGROUND: Emergency physicians make life-or-death decisions for patients, requiring them to perform aggressive, and often futile, resuscitation measures, which can be distressing for patients, families, and medical providers1. This literature review examines completed randomized controlled trials (RCTs), to identify what studies already exist and where the gaps are in current advance directive (AD) research. This will direct future RCTs on ADs, specifically in the setting of the emergency department (ED), where physicians are often unfamiliar with their patients end-of-life care preferences. This review also explores the interaction between social determinants of health (SDH) and ADs as these factors invariably affect end-of-life care for many ED patients. Methods: This literature review examined 78 RCTs involving a total of 34,094 participants. Information was analyzed and categorized across multiple dimensions, including gender, race, homelessness, and education. Data sources: PubMed and Scopus Results: Most studies (56 studies, 71.8%) involved patients with chronic illness, 35 studies (44.9%) enrolled participants from the outpatient medical setting, and 28 studies (35.9%) enrolled participants from the general, non-medical outpatient setting. One study (1.3%) involved emergency providers, and only 4 studies (5.1%) specifically identified whether or not patients wanted to be asked about ADs. Nine studies (11.5%) examined race/minority status in outcomes, while 6 studies (7.7%) specifically identified homeless, low income, and/or vulnerable populations. No studies specifically examined outcomes related to education level or gender. Discussion: Few RCTs have focused on ADs, with even fewer examining the relationship between ADs and emergency physicians. Additionally, there is little research identifying why people do not have ADs and illuminating barriers to AD completion. Lastly, the effect of SDH on ADs, which directly impacts disadvantaged populations and a large portion of ED patients, has not been well-studied. Conclusion: The aim of this literature review was to identify gaps in research on ADs and to gain direction for future research, especially as it relates to emergency medicine. However, this literature review reveals that there is still much research to be done on ADs, and there is not enough current research to guide future studies in one direction. However, the relationship between SDH and ADs should be studied, as disadvantaged populations frequently suffer from poor end-of-life care in other settings, in addition to the ED. Key words: advanced directives, literature review, emergency medicine, emergency department.

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Global Health

Comparing Diabetic Care Between the United States and Thailand: A Health System Perspective

Diabetes is a leading cause of mortality and morbidity worldwide. According to the World Health Organization (WHO), in 2014, there were 422 million people living with diabetes with a global prevalence of 8.4%. In 2016, diabetes was listed as the seventh leading cause of death with 1.6 million deaths directly caused by diabetes. Diabetes can lead to comorbid complications such as cardiovascular disease, nephropathy, retinopathy and peripheral vascular damage. Due to the high prevalence of diabetes, the detrimental health effects that it can lead to and the high economic burden of the disease on the healthcare system, diabetic care must be improved world-wide by critically examining the factors and healthcare delivery systems that contribute to diabetes outcomes. As of 2011, Thailand transitioned from a middle income country to a middle-high income country. Despite having a rather low GDP in 2002, Thailand successfully implemented the Universal Coverage Scheme to expand health coverage to the vast majority of its citizens. Today, Thailand and the United States are both concerned with the growing number of diabetes cases and both governments have invested in programs to reduce the prevalence of diabetes and their related comorbidities. The United States has a significantly higher GDP than Thailand and the United States spends much more on healthcare costs, but the prevalence and mortality rates of diabetes remain about equal in both countries. This research explores the structural factors of the United States' and Thailand's health systems to determine how health care delivery affects diabetes care in different populations. The healthcare systems in the United States and Thailand vary in structure, policy, private and public involvement and spending. The similarities and differences between each system affect how primary care systems and diabetes care are managed. By analyzing how each country delivers medical services, policymakers are able to target different aspects related to structure, financing and resource allocation to make improvements to the healthcare system.

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Health Policy

Private vs Public: How Insurance Type Impacts Patient's "No-show" Appointment Rates and Time to Surgery

BACKGROUND: Evidence suggests patients of lower socioeconomic status, of lower education, of younger age, who have a prior no-show history, whose residence is distant from the clinic, and/or who lack private insurance or who are self-funded frequently demonstrate outpatient no-show behavior. Less is known about how insurance type impacts compliance with outpatient care preceding major gynecologic surgery. Objective: To evaluate how insurance type (public vs private) impacts the frequency of missed appointments and the time lapse from first office visit to date of gynecologic surgery Design: We performed a retrospective cohort study at a single academic university hospital. Study patients included women who underwent laparoscopic hysterectomy, robotic-assisted hysterectomy, or minimally invasive myomectomy procedures between 2012 and 2018. Office appointment-related outcomes of interest included measures of time from initial consult to surgery (measured in months), measures of scheduled appointments attended, measures of scheduled appointments canceled, and measures of scheduled appointment 'no-shows' (defined as a patient not arriving for a scheduled appointment without a cancelation). Results: 939 patients were identified; 267 (28.4%) were laparoscopic hysterectomies, 368 (39.2%) were robotic-assisted hysterectomies, and 304 (32.4%) were myomectomies. In the sample, 340 (36.2%) patients had public insurance and 599 (63.8%) had private insurance. Public insurance was significantly associated with older age, a smaller proportion of White/ Caucasian race, higher BMI, higher gravidity, higher parity, a smaller proportion of married patients, more chronic medical conditions, and lower employment rates (all p<0.05). Unadjusted analysis of outcomes in the sample showed that public insurance was significantly associated with a higher average percentage of 'noshow' appointments when compared to private insurance (1.9% vs 0.8%; p<0.01) and that public insurance was significantly associated with having at least 1 'noshow' appointment when looked at categorically (6.5% vs 2.5%; p<0.01). After adjusting, those who were publicly insured were 2.24 times more likely to have had at least 1 'no-show' appointment compared to those who were privately insured (95% CI: 1.03 - 4.88; p=0.04). No statistically significant differences were detected between public and private insurance when looking at time from initial consult to surgery, attended appointments, or canceled appointments. Conclusion: Patients with public insurance were more likely to miss scheduled appointments than those with private insurance. There was no difference between groups temporally from initial consult to surgery. Further research needs to be conducted to understand what socioeconomic factors impact publicly insured patient's access to appointments and how we can remove those barriers.

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Global Health

Distribution of Childhood Asthma Cases and Treatment Sites in Nevis, West Indies

OBJECTIVES: The goal of this study was to compare the pediatric asthma prevalence and distribution between the six community health clinics and previously collected data at the Alexandra Hospital Emergency Room in Nevis, Wl. Methods: A retrospective chart review of pediatric patients (0-10 years of age) who visited the clinics between January 1st, 2010 and December 31st, 2014 was conducted. Information about asthma and respiratory-related illness was collected. Data from the years 2012-2014 was used for purposes of comparison with previously collected data from Alexandra Hospital Emergency Room. Results: Of the 192 patients represented, 7 were asthmatic (4%). There were 570 clinic visits associated with the 192 patients. Respiratory-related visits, including asthma, accounted for 56% of clinic visits. Of the 640 ER presentations represented, 89 were asthmatic (14%). Males and children 0-5 years of age accounted for a higher proportion of asthmatic cases at the ER and respiratory-related visits to the clinic. A greater number of respiratory-related clinic visits and asthmatic ER presentations occurred in the first calendar quarter of the year. Among charts indicating a home parish, most asthmatic presentations were from St. John's or St. George's parishes. Charleston clinic, located in St. Paul's parish, had the largest proportion of respiratory-related clinic visits. Conclusions: The charts reviewed at both the community clinics and the Alexandra ER identified higher utilization of services by similar subpopulations. Inconsistencies in data collection between the clinics and hospital ER necessitate a standardized form of record keeping.

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Digital Health

Application of Ottawa Ankle Rule via Telemedicine

Telemedicine is a care modality that may increase access to care. In emergency medicine, it can be a valuable tool to both reduce overflow burden and reach patients who otherwise could not get to facilities. As telemedicine continues to increase the reach of providers, there is a growing need to verify and confirm the quality of services being provided through this modality. The Ottawa Ankle Rules (OARs) is a widely used, validated clinical decision tool. Our objective is to validate the use of the Ottawa Ankle Rules applied via telemedicine by determining the concordance of decisions made between clinicians over telemedicine and in-person. The study was conducted at an urban academic emergency department. Patients were recruited over a 6 month period. Eligible patients were above the age of 18 and presented with a chief complaint of ankle/foot injury occurring in the last 3 days. Those meeting the study criteria were first evaluated utilizing the Ottawa Ankle Rules virtually by a clinician, and then subsequently evaluated in person by a clinician. Each clinician committed to their recommendation based on examination and OARs decision rule and was blinded to the other clinicians' recommendations. Results demonstrated low rates of concordance between clinicians on each aspect of the Ottawa Ankle Rules evaluation criteria. It consists 6 questions total, but only 4 were asked depending on the perceived location of pain. Both groups also demonstrated a high rate of false negatives compared with the validations studies in literature. The ultimate clinical decision to order a follow-up x-ray based on the findings of the Ottawa Ankle Rules also revealed low concordance. More work needs to be done to elucidate the underlying cause of low concordance between clinicians. It is possible that variable or imprecise application of the OARs limited its consistency and utility in person. This makes interpreting our data difficult. Future direction could look at consistent application of clinical decision rules and how individual clinicians' perceptions of a patient's pain influence outcomes of clinical decision tools.

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Specialty Care via Telemedicine for Chronic Disease Management in an Urban Federally Qualified Health Center

INTRODUCTION: There is a paucity of research on background no-show rates for telemedicine visits. Furthermore, co-locating clinical services and integrated care models, remain relatively underdeveloped with respect to telemedicine. We developed of a new program, which co-locates specialty care from an Academic Health Center via telemedicine with primary care at a Federally Qualified Health Center (FQHC) to expand access to specialty care for an urban, underserved patient population. The program created capacity to provide secure, live audio-visual encounters for patients with difficult to manage hypertension, diabetes and chronic kidney disease. The aim of the study is to determine whether the no-show rate for specialty care via telemedicine is the same for in-person visits at the corresponding academic and health center facilities. Methods: Patients are referred to the program by their primary care provider, with the ability to obtain both initial consultation and ongoing care from a specialist at their usual site of care, the FQHC. Specialists included cardiology, endocrinology, & nephrology. Grant funding paid for set up and equipment of a telemedicine room at the FQHC. The FQHC medical assistants were trained as tele-presenters. Patients referred to the study by primary care physicians (PCP) were scheduled to return for tele-consult with the appropriate specialist usually within 2 weeks. A consult note was returned to the PCP via eFax for both initial and follow up visits. The study was approved by the IRB. Results Between March 2017 and February 2020 118 unique patients (50%M, age ranging from 23 to 83 years) were recruited into the study and completed 249 consultations. The overall no-show rate was 27.8%. By specialty, the no-show rate was 21.6% for Cardiology, 28.9% for Endocrinology, and 27.4% for Nephrology. Out of the 249 completed visits, 7% were from Cardiology consults, 63% from Endocrinology, and 29% from Nephrology. The majority of patients had Medicaid as their main method of insurance (Amerihealth, DC Medicaid, Amerigroup). Other insurances included United and Medicare. Conclusions The no-show rate for this program is slightly lower than the academic center outpatient clinic overall no-show rate and Medicaid patient no show rate, but the study is underpowered to identify a significant difference. A better understanding of barriers to care in FQHC patients is warranted to determine strategies to improve chronic disease management using telemedicine.

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Analysis of the Relationship Between NS1 Levels and Dengue Severity During the Critical Phase-Furthering the Literature on the Relationship Between Non-Structural Protein 1 and Dengue Hemorrhagic Fever

Dengue Virus (DENV) is a leading cause of pediatric morbidity and mortality worldwide. The critical phase of Dengue begins days 3-7 of disease. Its beginning is signaled by defervesence. The patient's progression through this phase dictates whether they recover or progress to hemorrhagic fever or shock syndrome. (DHF/DSS). A lesser understood mechanism by which DENV may promote vascular permeability and hemorrhage may have to do with Non-Structural Protein 1 (NS1) which is both anchored on the surface of infected cells and secreted early on in dengue infection. NS1 rapid tests have been used historically as a serum test marker of active dengue infection. The purpose of this study is to investigate whether the average free serum NS1 levels in those who progress to dengue with warning signs and severe dengue is significantly higher than NS1 levels in those with dengue without warning signs. The goal for enrollment was 30 total patients with suspected dengue confirmed with NS1 test: 10 with suspected dengue without warning signs, 10 with suspected dengue with warning signs, and 10 patients with suspected severe dengue. Currently 17 cases have been evaluated: 2 patients without alarm signs and 13 with alarm signs. Patients were enrolled by two physicians. San Ignacio Clinic in the city of Baranquilla-Atlántico and the virology laboratory of the Universidad del Bosque in Bogotá-Cundinamarca in Colombia were collection sites for this study. Severity of each patient?s dengue was classified using the 2009 WHO case severity guidelines on their first day of admission. Average NS1 was taken across course of disease via INBIOS NS1. A Two Sample T test was run to compare mean values of NS1 on the day prior to defervescence as a proxy metric for near-peak NS1 in the disease course. A Welch Two Sided Sample t-test was conducted. There Mean of 651.9668 units/ml for the group with no symptoms and a mean of 181.7164 units/ml for the groups with symptoms. t = 0.95148, df = 2.0266, p-value = 0.4407. The 95% CI was -1629.747? 2570.248. Conclusion The data currently does not yield statistical significance for our hypothesis but this may change with more data points. Vaccination attempts for DENV have been unsuccessful and in some cases injurious NS1 should be considered as a potential therapeutic target for vaccination or hemorrhage symptom prevention via anti-NS1 Antibodies.

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Analysis of State Requirements on Telepresentation During Remote Physician Consults

The relatively new introduction of telehealth into the healthcare field has come with many benefits to those who have adopted its use, improving the administration of quality care and the productivity of healthcare delivery. Unfortunately, numerous hurdles persist in this ecosystem due to inherent gaps that accompany not only technological developments but also any newly implemented system. The current discrepancy in legal responsibility among different entities in the telehealth industry is one of these gaps, which creates vulnerability in data protection as well as patient health safety. Teleconsultations, which are remote visits with providers from distant sites, have been recently gaining popularity; however, the experience of these consults varies depending on where in the United States the teleconsultation takes place. One significant component of a remote visits is the presence of a telepresenter, who is a trained individual physically with the patient during the consultation. The current legal statuses of what each state mandates with regards to the requirements of telepresentation during a remote visit are not well documented. This analysis aims to determine the existing status of all fifty states regarding this specific requirement. Information was retrieved from state and legislative websites as well as historical online documents in order to determine the current mandates of telepresentation by Medicaid and the respective state's Medical Board. In the United States, great variability was found, with 24 states' Medicaid and Board of Medicine organizations having no mention of telepresentation at all. Among the states that did have a recommendation or requirement, 21 of them had differences in what was stated between the Medical Board and Medicaid. When telepresentation was mentioned, 5 states made it a mandatory requirement, 11 states did so only under special circumstances, and 2 states did not specifically provide any standard. These inconsistencies between state recommendations become momentous due to the paradigm of virtual healthcare delivery, where the provider and the patient are no longer under the same roof. With this one adjustment, the rules at the state and intuitional level can have impactful implications; all parties across the states must uniformly adapt to serve the patient even though they may be under a different geographical jurisdiction as the physician. These rules must especially take into account the unique circumstances that can accompany a teleconsultation, such as the absence of a supportive clinical environment or even a telepresenter, creating novel challenges that healthcare has never had to face.

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Absence of a July Effect on Hospital Length of Stay (LOS) after Primary Total Hip or Knee Arthroplasty (THA, TKA)

There is widespread belief in the existence of a "July Effect" in healthcare - an increase in complications and poor outcomes at the beginning of the academic year. While the absence of a "July Effect" on adverse clinical events after Total Hip and Knee Arthroplasty (THA, TKA) has been demonstrated previously, the presence or absence of an effect on hospital length of stay (LOS) after THA/TKA was not assessed. We hypothesized that a "July Effect" would be present, resulting in more frequently prolonged LOS after THA/TKA. We sought to address this question using the American College of Surgeons National Surgical Quality Improvement Program (ACS-NSQIP) database. Cases of primary THA/TKA were identified in the ACS-NSQIP database for years 2006-2011. Emergency procedures were excluded. The primary outcome of interest was prolonged LOS, defined as >4 days postoperatively. Other outcomes recorded included 30-day mortality or return to operating room (OR), as well as adverse clinical events. A modified Charlson Comorbities Index was calculated and used along with age and American Society of Anesthesiologists (ASA) class to adjust analyses for patient variables. Univariate and multivariate analyses were performed to assess association between resident involvement in a case and any of the outcomes, and whether this association varied in Q3. 34,818 cases were included. Mean age 66.9, standard deviation (SD) 10.5, and mean BMI 32.0 (SD 7.2). Residents were involved in 9669 cases (28%). The percent of cases by quarter were 24%, 23%, 26%, 27% for quarters 1-4, respectively. LOS > 4 days occurred in 12% of resident cases vs. 11% of non-resident cases (p 4 days remained significant, after adjusting for quarter, year, procedure, race, sex, age, BMI, eGFR, and comorbidity score, but the Q3 effect was no longer significant. However, the resident by Q3 interaction was not significant for LOS, operative time, medical morbidity, or any other outcome. Our data does not support the presence of a "July Effect" on length of stay. This finding is in line with the prior work by Bohl, regarding adverse clinical outcomes after THA/TKA. Our data also agrees with prior research regarding cost and length of stay at teaching hospitals after THA/TKA, while clarifying that this increased LOS associated with resident participation is not subject to a "July Effect".

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Health Policy

Is This a Child? How EMS Defines the Pediatric Population

There is no current national standard for how to define a pediatric patient in Emergency Medical Services (EMS) systems in the United States. In order to better understand and demonstrate how different EMS systems choose to apply pediatric protocols, EMS protocols were reviewed from the available thirty-nine states and the fifty-eight counties of California. The analysis revealed that varying criteria are used in these jurisdictions to determine whether to apply adult or pediatric protocols. Overall, there are twelve different criteria; the most common being "less than fifteen years old." However, age cutoffs for pediatric protocols range from eight to eighteen years old. In contrast to the age criteria found in many protocols, some protocols specify certain physical attributes such as weight, height, or secondary sex characteristics. Consistency is therefore a problem between these jurisdictions concerning what determines the application of pediatric versus adult protocols. From a systematic perspective, the variability in the definition of a pediatric patient presents significant potential for inconsistencies in care and determination of appropriate receiving facilities. In a larger incident or disaster where more than one jurisdiction may be involved - for example, an incident along state or county borders - this could pose serious adverse outcomes. It also presents a substantial challenge to performing national-level analysis of EMS data. By identifying and calling attention to the potential harm created by the lack of consistency in the pediatric patient definition in EMS protocols, strides could be taken towards making a national standard to rectify this problem.

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Repurposing Health Care: Perspectives on Integrated EcoHealth Literacy into Clinical Practice

OBJECTIVE: This primary qualitative research presents interdisciplinary perspectives on the nascent field of EcoHealth literacy (EHL) and its myriad functions in clinical practice. The intention of this research is to further engaging clinicians in the international dialogue surrounding sustainable development amidst the current environmental crisis. Conceptual Framework: The first objective of this research establishes a framework for an EcoHealth (EH) approach, the social determinants of health, health literacy, and EHL. The literature review demonstrates a need to explore new avenues for EHL promotion, particularly in clinical settings, while medical education curricula have demonstrated increasing progress on this front. Methodology: Participant selection was conducted through outreach, snowball sampling, and academic referrals. In-person, phone, or Skype interviews were conducted in the participant sampling process after obtaining Human Subject Review (HSR) approval and informed consent from research participants. Results & Analysis: A thematic analysis presents participant responses pertaining to EHL standpoints, the perceived relationship between EHL and climate change, EH risk classification, capacity-building, mechanisms of promotion, policy frameworks, implications for health equity, and challenges of EHL integration. The results demonstrate that there are various opportunities for action and innovation in different clinical specialties. Salient challenges involve intra-disciplinary resistance, demanding medical education curricula, intergenerational inequity, and an isolated literature presence on this subject matter. Conclusion: Clinicians serve in critical capacities and exhibit remarkable potential to contribute to the era of sustainable development and climate change. However, meticulous cross-cutting efforts must be made to repurpose the role they currently play in health care by capitalizing on the potency of interdisciplinary collaboration.

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A Survey of Attitudes and Perceptions of Humanitarian Aid-Workers Towards Refugees

Since 2015, the number of asylum seekers has increased dramatically worldwide. Greece in particular, due to its relative proximity to the Middle East and Africa, has been a key entry point for hundreds of thousands of refugees hoping to enter the European Union. Recent studies have suggested that natives with increased exposure to the refugee crisis develop more negative anti-asylum seeker attitudes and hostile behavior. However, little is known about the beliefs of those who work most closely with refugees and who are most familiar with the context of global migration. A review of the pertinent literature and discussions with experts in the field has identified a clear need to develop a systematic and effective tool to assess these more nuanced perspectives. The George Washington University Global Mental Health Program (GW GMHP) has designed a 27-question survey to assess humanitarian aid-workers' attitudes towards and perceptions of refugees. The questions are adapted from a survey by the London School of Economics which asked Greek island hosts about their attitudes towards refugees, including refugees' perceived contributions to crime, terrorism, and the Greek economy (Hangartner et al. 2019). The GW GMHP adapts this survey to reveal the extent to which refugees face trauma and violence, the impact on families, and the perceived risks they pose to others. To explore respondent bias, aid-workers themselves are asked about their family history, employment longevity, and financial security. Both qualitative and quantitative data are collected in the form of open-ended and multiple-choice questions. The survey is administered in person and takes approximately 20-30 minutes to complete. Beginning in June 2019, English-speaking aid-workers from 8 prominent Athens-based NGOs (METAdrasi, SolidarityNow, Médecins Sans Frontières, The Home Project, Doctors of the World, Praksis, ARSIS, and the International Organization for Migration) were invited to participate in the survey. As of February 2020, 51 aid-workers have been interviewed as data collection continues. To our knowledge, this is the first survey designed specifically for professionals working in Europe's refugee crisis. A review of their perspectives on causal factors like trauma and risk will underscore the globe's shared causes and cost of the refugee crisis and heighten focus on resources needed by government agencies and NGOs. Developing resilience training, psychological first aid, and other social supports are likely results of survey research that is focused on the common themes of global migration.

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Racial Demographics and Resource Utilization Among Teenagers with Firearm-Related Injuries Presenting to the Emergency Department, 2010-2015

Health disparities exist in chronic diseases, injuries and illnesses. In firearm-related injuries, Black teenagers constitute a significant number of the gunshot wound (GSW) victims in the emergency department (ED) compared to White teenagers. In this study, we utilize a national database to describe the demographics, injury patterns, and resource utilization of GSW victims in the teenage population. A retrospective review of the National Trauma Data Bank was performed. Using ICD-9-CM E-Codes, variables were created to identify all patients between 13 and 19 years old who sustained firearm-related injuries between 2010-2015. Demographics, clinical details, and substance use of the study population were analyzed. Outcomes studied included mortality, ventilation days, Intensive Care Unit (ICU) Length of Stay (LOS), and location of the GSW incident. During the study period, 34,855 patients between the ages of 13 and 19 were admitted to the hospital following a GSW. The plurality of patients, 17,092 (49%), identified as Black and 4593 (13%) patients identified as White (non-Hispanic). Compared with the White teens, the Black teens demonstrated increased odds of sustaining a GSW outside of the home (OR 3.0, 95% CI 2.8-3.3, P<0.0001), whereas the White teens were more likely to sustain a GSW at home (OR 3.8, 95% CI 3.6-4.1, P<0.0001). A positive screening for alcohol was identified more often in White teens compared to the Black teens (10% vs. 9%, P=0.01). The mortality of Black teens was higher in the ED compared to White teens (3.3% vs. 2.5%, P=0.01) and they also spent more time in the ED (234.8 minutes vs. 168.7 minutes, P<0.0001). Black teens spent more days in the ICU (5.2 vs. 5.1, P<0.0001) and were more likely to be on a ventilator (4.7 vs. 4.0, P<0.0001) compared to their White counterparts. The White teenage population was sent to the ICU at a higher rate compared to their Black counterparts (20% vs. 13%, P=<0.0001) and to the operating room directly from the ED (31% vs. 29%, P=0.01). This study highlights a significant public health concern that Black teens are more likely to experience a firearm-related injury and their injuries are more likely to be outside of the home, fatal and require longer stays in the ED and ICU. White teenagers are more likely to sustain GSWs inside of the home and have positive screens for alcohol use. Interventions are needed to improve neighborhood safety, and eliminate disparities in firearm-related injuries.

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Can EMOJI's Assess Patients' Mood and Emotion in the Emergency Department-An Emoji Based Study

As healthcare progress and aligns with our technologically advanced society, the need to modernize healthcare and patient relations arises. The use of emoji has rapidly increased worldwide as standard communications adding context and clarity to words. Our objective was to prospectively assess patients' mood and emotion in the emergency department (ED) throughout their visit. A cohort of 348 ED patients above the age of 18, with an emergency severity index (ESI) between 3-5 was prospectively enrolled. A screen with ten ordered emoji faces ranging from 1 (extremely satisfied, smiling face) to 10 (extremely dissatisfied, angry, red face) was given to each patient upon arrival to the ED. Patients were asked to identify their mood by selecting one mood-determining emoji every 30 minutes after arrival. Patients' characteristics were examined to assess the effect that these factors may have had on the patient's first selected emoji, their last, and the change between the two. To analyze our data, various statistical analyses such as time series, Spearman correlation, multiple linear regression, categorical, and nonparametric statistics were used. Only data from patients for whom at least two emoji selection events were recorded in the ED were used. On the emoji scale, mean emoji at admission and discharge were 5.8+2.7 and 5.30+2.8 respectively (p=0.0004; Wilcoxon signed rank test); showing significant improvement in patient mood. Emoji at admission was positively correlated to the discharge emoji(r=0.49, p<0.0000; Spearman Correlation). At admission 26 (7.4%) and 30 (8.6%) patients selected emoji 1 and 10 respectively, while 36 (10.3%) and 32 (9.2%) selected these emoji at discharge. Overall, out of 348 patients, 112 (32.2%) remained at the same level of mood, 104 (29.9%) improved mood, and 88 (25.3%) had worsening mood. The change in emoji was not related to wait time or LOS on emoji selection (p=0.11) or patient age effect (p=0.64). It was however positively related to emoji selection at admission (slope=0.53, p<0.000), meaning one unit increase in the initial emoji, improved the mean emoji by 0.53 points. Mean emoji at admission for male was significantly lower than female (6.2+2.6 v. 5.4+2.6; p=0.006) and slightly higher mood change (slope=0.52, p=0.065). Emoji can be a useful tool in tracking a patient's mood during the ED visit. These emoji surveys are simple to administer and could impact the overall management and care within the ED.

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A Qualitative Study of Workplace Violence Among Healthcare Providers in Emergency Departments in India

BACKGROUND: Workplace violence has been increasingly recognized as an important and dangerous issue in Emergency Departments (EDs) around the world. Our institution has longstanding partnership programs in Emergency Medicine (EM) education and training across India. Prior studies have revealed important themes of the high prevalence of workplace violence. The aim of this study was to learn more about the issue of workplace violence among various healthcare providers in EDs in India. Methods: Semi-structured interviews were conducted in-person with physicians, nurses and paramedics who work in various EDs in India. Interviews were recorded and transcribed. A hybrid thematic analysis approach was used to determine dominant themes. Interviews were coded using NVivo. The study was deemed exempt by our institutional review board. Results: 63 interviews were conducted at 7 sites across India. 74.6% of the interviews were with physicians (residents or consultants), while 25.4% were with non-physicians (nurses or paramedics). Events were most often described as involving accompanying persons to the patient, not the patient themselves. Most events involved verbal abuse, although 21 different respondents described some kind of physical violence (33%). ED factors such as busy times with high patient volumes or periods of waiting are associated with increased violence, as well as incidents with unanticipated outcomes such as patients with severe illness or death. Decreased levels of health literacy among patients often contribute. Providers reported negative consequences of workplace violence on quality of care for patients (42.9%) and their own motivation to work in the ED (57.1%). Communication strategies were frequently proposed as interventions to mitigate violence in the future including both provider communication as well as public awareness campaigns. Conclusion: Workplace violence is a frequent although unacceptable reality for ED physicians and staff around the world. Alarming levels of verbal and physical abuse and their impact on patient care are described. Further investigation into preventive strategies must be a priority.

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The Adolescent Experience of Filling Prescriptions for the Treatment of Sexually Transmitted Infections

BACKGROUND: Less than 60% of medications prescribed to adolescents for treatment of sexually transmitted infections (STIs) in the emergency department (ED) are filled. Untreated STIs can lead to serious complications such as infertility and ectopic pregnancies. Barriers to prescription filling among this high risk group remain poorly understood. Objective: To describe adolescents' experience in STI prescription filling. Methods: We conducted telephone interviews with adolescent patients aged 13-21 years who were diagnosed with chlamydia or pelvic inflammatory disease and required outpatient antibiotic treatment in two urban pediatric EDs. Through semi-structured interviews, participants responded to questions related to barriers to prescription filling and medication adherence as well as attitudes towards the use of mobile health (mHealth) technology to reduce barriers to treatment adherence. Descriptive statistics were used to summarize responses, and direct patient quotes were selected to provide additional context. Results: We interviewed 19 adolescents who were prescribed outpatient STI treatment. The mean age was 17.1 (SD+/- 1.6) years and the majority were female (79.0%). Over half (57.9%) of the participants filled their prescriptions from the pharmacy, while 42.1% returned to the ED for treatment. We were unable to successfully contact any adolescents (n=2) who did not receive treatment either through prescription filling or ED revisit. 100% of adolescents who filled their prescriptions had notified their caregivers about their STI diagnosis, compared to 37.5% of those who returned to the ED (p<0.01. Half of the patients who returned to the ED preferred returning for treatment, expressing taking their medication in front of the doctor as being advantageous. Less than half (41.7%) of participants were open to receiving their medication from a school nurse due to concerns about anonymity. Adolescents identified several barriers to prescription filling: cost (95.0%), lack of insurance card (89.5%), and transportation (89.5%). The majority of participants (94.1%) expressed interest in using mHealth technology to discuss sexual health with their clinical team. Conclusions: Participants identified several barriers to filling prescriptions. Participant communication with their caregiver about their STI diagnosis may play a role in prescription filling. Future work should further explore the role of caregiver communication and address perceived barriers by incorporating mobile health technology.

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Community and Urban Health

Increasing Contraception Usage Among Female Adolescent and Young Adult Patients Living with HIV - Ryan White Program Experience

BACKGROUND: In 2016, an estimated 50,900 adolescents and young adults (AYA) were living with HIV in the United States. Of new HIV diagnoses in 2018, 7807 were diagnosed in youth between the ages of 13 and 24. As this population of AYA continues to grow, they face decisions regarding their sexual health and behaviors. Our quality improvement (QI) project based in the Children's National Hospital Special Immunology Services (SIS) subspecialty clinic, aims to identify female AYA living with HIV who are sexually-active, provide on-site family planning counseling, and when indicated, link them to contraception services. Objectives: The specific aim of this QI project was to increase contraception usage from 30% to 60% in sexually-active female SIS AYA living with HIV who do not desire pregnancy from June 2018 to June 2020. Methods: In October 2018, the initial chart review was conducted to establish baseline prevalence of contraception usage and a key driver diagram was created. Interventions were delivered over several Plan-Do-Study-Act (PDSA) cycles. During PDSA cycle #1, case managers utilized UberHealth and bus/metro vouchers to aid patients in transportation to outside appointments with obstetric/gynecologist specialists. PDSA cycle #2 was focused on conducting interviews with patients and multidisciplinary team members regarding continued barriers to contraceptive usage. Findings of a literature review and interviews were summarized and presented at a multidisciplinary Ryan White Quality Meeting. PDSA cycle #3 saw the creation and implementation of a standardized operational protocol that provided streamlined referral to obstetric/ gynecologist specialists for contraceptive services. Results/Discussions: Between October 2018 and February 2020, 31 female patients (ages 14-23) from SIS (total number of patients = 164) were identified as sexually active with no desire for pregnancy. At baseline data collection, only 30% of identified sexually active patients were using physician-prescribed contraceptives, including oral contraceptives (OCPs) and long-acting reversible contraception (LARC). After PDSA#3, the number of identified patients using contraceptives doubled. An overall improvement from 30% to 61.3% was seen in the utilization of all prescribed contraceptive methods with a larger increase in patients choosing OCPs over LARCs. The utilization of LARC methods was relatively similar throughout the duration of this QI project, showing a modest increase from 30% to 38.7%. Next steps include performing additional PDSA cycles to continue increasing contraception usage amongst female AYA seen in SIS clinic and obtaining baseline contraception data for female partners of our male AYA living with HIV.

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Health Policy

The Dual Emergency When Race and Ethnicity Meet Stroke Medicine: A Review Exploring Disparities in Stroke Prevention

PROBLEM STATEMENT: According to the CDC, more than 795,000 individuals in the United States will experience a stroke each year, 140,000 of whom will die as a result. It is well established that the risk of stroke and subsequent mortality is not distributed equally among all races and ethnicities. Compared with nonhispanic whites, both black and latinx individuals are likely to experience stroke at a younger age. Moreover, risk of first stroke is twice as high for latinx individuals and 2 to 4 times higher for blacks than for nonhispanic whites. The increased risk of stroke associated with these groups is strong enough that both race and ethnicity are included as nonmodifiable risk factors for stroke. The literature has already demonstrated disparities in the administration of thrombolytics and in level of in-hospital stroke care. Further, epidemiology of several unmodifiable risk factors for stroke themselves include race and ethnicity. This review seeks to explore the contribution of race and ethnicity to stroke incidence through disparities in risk factor mitigation for stroke prevention. Methods: A search is being conducted of MEDLINE and Scopus databases for studies performed on race and ethnicity in stroke risk factors. The keywords used for search of the database include "race", "ethnicity", "stroke", "risk factor", "implicit bias", "disparities", along with permutations of the same. Keywords and MeSH terms for modifiable risk factors for stroke as identified by the INTERSTROKE case-control trial were also used along with similar terms: hypertension, diabetes, current smoking, abdominal obesity, hyperlipidemia, physical inactivity, alcohol consumption, diet, psychosocial stress and depression, cardiac causes. Studies in English published between 2010 and February 2020 were included. Studies dealing with nonmodifiable stroke risk factors, other than race and ethnicity, were excluded as were those focused on outcomes. Studies were also excluded if race/ethnicity were not analyzed as subpopulations, site of study was not in the United States, or the studies were retracted from publication. Findings/Discussion: The review is ongoing, but it is expected that modifiable risk factors for stroke will themselves reveal disparities in treatment or counseling from health care providers, potentially pointing to widespread implicit bias on the part of either provider or patient. There is a need for further studies explicitly exploring implicit bias on the part of providers in primary and secondary stroke prevention. If found, this could provide an important avenue for improvement in stroke incidence. Keywords: disparities, stroke prevention, race, ethnicity.

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Caretaker Concerns During Radiology Procedures in Nation of Gross Nation Happiness

Bhutan is the first carbon negative country in the world, as well as the first country to pursue happiness as a national policy through the Gross National Happiness pillar. The happiness concept is acknowledged as a balance between spiritual, material, physical and social needs. As a result, the Ministry of Health (MoH) in Bhutan developed a form of universal healthcare that prioritizes healthcare as a basic need in alignment with the happiness initiative. The Bhutanese culture relies on the techniques of Traditional medicine as its primary form of healthcare. Bhutan is gradually shifting to a state of equanimity between the use of Traditional medicine and Western medicine, though there remain many areas for improvement in Western medicine intervention. In 2015, the MoH and the American Bhutanese Association for Health Foundation (ABAH) identified a need for increased radiologic intervention as an important area of interest. The idea of determining the limitations, both culturally and geographically, became a primary concern for improving access to radiological intervention. With these limitations in the pediatric population, prominent concerns were identified spanning safety of the pediatric patients, comfortability in physician care, and access to care. Over 21 days, 53 survey interviews and 8 open-ended interviews were conducted in three regions of Bhutan. These hospitals were identified utilizing radiology as a primary healthcare intervention. Likert style concerns identified 42 items of likely concern to the pediatric caretaker population. Participants were asked to rank each concern from 1 to 7. These interviews identified different primary concerns in the Southern, Eastern, and Western Regions of Bhutan. The survey identified one statement as the most important: "I am worried about what my village might think of me taking my child to have the X-ray or CT scan (item 3)". In addition, the open-ended interviews revealed a significant lack of education regarding CT machines, lack of trust in physicians, and limited access to machines in hospitals that have X-ray and CT machines. As Bhutan relies more on Western medical interventions, there remains a dissonance between their culture and the universal acceptance of Western medicine. Implementation of Western radiology techniques as a primary healthcare method requires prioritization of cultural sensitivity and an increased understanding of the community. These interviews recognized a need for further investigation into the limiting factors that stifle the improvement of radiologic intervention in the nation of Bhutan.

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Development of A Clinical Checklist as a Standardization Tool for Improving the Care of Medical Foster Care Children with Medical Complexity

BACKGROUND: Children with medical complexity (CMC) require individualized care, management of multiple medications, specialized diets, and complex medical technology. Such intensive care may overburden parents of CMC, and medical foster care services may provide additional support. Second Family is a non-profit organization in Maryland caring for CMC in medical foster care. Once patients enter Second Family, they begin receiving primary care at Children's National. However, during this transition, patients and Second Family caretakers often arrive at appointments without adequate knowledge of patients' background and needs, impairing providers' ability to treat them. Objectives: To reduce these information gaps and improve care for these CMC, we developed a standardized clinical checklist for complex care visits with Second Family patients at Children's National. Design/Methods: We approached this project using the "Plan-Do-Study-Act" (PDSA) cycle, which involves creating an initiative (plan) testing the initiative (do), studying test results (study), and refining the initial plan accordingly (act). 1) Plan: To develop a standardized clinical checklist for complex care visits with Second Family patients at Children's National. 2) Do: Through a literature review on the needs of CMC, and observation of patient-provider and caretaker-provider interactions, identify elements for the checklist. 3) Study: Through discussions with providers and caregivers, collect feedback on the checklist. 4) Act: Revise checklist until we reach a final product. Results/Discussion: Through continuous research, revision, and collaboration, we finalized a tool that Second Family caretakers and patients can use to prepare for appointments. The checklist includes four major components: 1) Social and Legal Contact Information 2) Medical Contact Information 3) A Medical Information Table for caretakers to complete prior to each visit 4) A section of the document dedicated to new concerns, medications needing refills, new equipment to order, and overall goals of care. Through implementation of this checklist, we hope to improve the Complex Care Team's ability to care for Second Family patients. On a local scale, we expect that this checklist will improve interactions between Second Family patients and primary care teams at Children's National. More broadly, we hope our checklist will serve as a tool or template for other measures of standardizing care among children with medical complexities. This tool may also be expanded and externally validated via use in other populations, such as Second Family patients visiting the Emergency Department, foster families with CMC not in a group medical home, adults with medical complexities, and general primary care visits.

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Exploring the Relationship Between Telehealth Utilization and Overall Hospital Utilization Patterns in the Medicare Population at UCSF

Under the current Medicare payment model, telehealth coverage is limited to rural areas, which are defined as health professional shortage areas, to reduce overutilization and keep costs down. A recent study showed that telemedicine utilization in rural Medicare populations, particularly for mental health, complemented healthcare management, but did not increase utilization. Others argue that expanding telehealth service coverage may increase utilization and drive up healthcare costs. While these are valid points, the impact of telehealth on healthcare utilization patterns is not well understood in the Medicare population. UCSF is a quaternary care center that is uniquely positioned in that it has consistently offered telehealth to all patients regardless of payer status. Thus, Medicare patients who utilize UCSF's telehealth are not covered for telehealth services. In the current study, we determined if there was a relationship between telehealth utilization and overall hospital utilization in UCSF's Medicare population. Subset analyses on Medicare patients was performed using data from two of the highest utilizing telehealth clinics: Symptom Management Clinic and Endocrinology Clinic. To determine if telehealth services among Medicare patients was associated with decreased hospital utilization, we used ED visits as the primary outcome and outpatient visits as well as patient portal interactions as covariates. Results show that there was a significantly smaller percentage of telehealth patients that utilized the ED versus non-telehealth patients in both clinics (40% vs. 48%, respectively, for Symptom Management Clinic and 11% vs. 24%, respectively, for Endocrinology Clinic). We used a Poisson regression to model our data and it showed that the incidence rate of ED visits among telehealth users (IRR, 95% CI) is significantly less than that among non-telehealth users in the Symptom Management Clinic and Endocrinology Clinic (0.78 and 0.52, respectively). There was heterogeneity in the relationship between telehealth visits and office visit patterns, with the Symptom Management Clinic demonstrating equivalent office visit utilization between telehealth and non-telehealth users while the Endocrinology Clinic showed a slightly greater percentage of telehealth users who had office visits compared to non-telehealth users (99.1% vs. 97.5 %, respectively). Our findings indicate that telehealth utilization is associated with an overall decrease of ED utilization in the Medicare population. However, the relationship between telehealth use and other utilization patterns (e.g. clinic visits, emails) is likely confounded by variables such as the underlying disease and technological literacy. Future studies are needed to better understand the impact of telehealth on overall care utilization.

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Immigration Legal Screening in a Primary Care Pediatric Office

Over 5 million children living in the U.S. were born to undocumented parents, and 90% of these children are U.S. citizens. Undocumented immigrants experience a lack of employment rights, limited access to social service networks and health care, and a persistent fear of deportation and family separation. This has profound implications for health and well-being, especially in the context of changing immigration policy and growing anti-immigration sentiment. A large number of undocumented immigrants may qualify for legal protected status (e.g., asylum, U-visa, T-visa, Violence Against Women Act). However, due to lack of awareness and/or access to quality and affordable immigration legal services, many undocumented immigrants never pursue these options. This study used a brief online immigration legal screening tool (www.immi.org) to identify patients and parents at the Adams Morgan Children's Health Center who may qualify for a form of protected legal status. Families who screened "positive" were connected with affordable and reliable local immigration legal organizations. Follow-up 3 weeks later was done to ensure a connection was made. Pre- and post- screening surveys were also conducted to assess awareness, stress, and anxiety around immigration status; these surveys analyzed the effect of immigration legal screening on participants' emotional well-being and knowledge regarding immigration legal relief options. Based on screening results, 36 of 41 participants were identified to possibly qualify for a protected legal status. Data show that unstable immigration status was associated with high rates of anxiety around deportation (90%) and uncertainty of their status (83%). Participants expressed lack of awareness of immigration relief options (71%) and lack of confidence handling legal issues or seeking help through legal resources (56% and 61%, respectively). Data collection is early and still ongoing, with too few post-screening surveys completed to provide significant data analysis. The study's results reflect the negative impact of unstable immigration status on the well-being of patients and their families, reinforcing the viewpoint that unstable immigration status functions as a social determinant of health in immigrant communities. Immigration legal services are an important component of a medical home serving immigrant families, such as Adams Morgan Children's Health Center. Unfortunately, many settings do not have access to immigration legal partnerships; nonetheless, this free, online legal screener is an effective way to triage the highest need individuals in order to facilitate connections to community legal resources.

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Health Policy

The Effects of Rising Housing Prices in Manhattan on Potentially Preventable Hospital Admissions from 2010 - 2019

People who face housing instability are more likely to experience poor health in comparison to their stably housed peers. Furthermore, low income families with difficulty paying their rent are less likely to have a usual source of medical care and more likely to postpone needed treatment than those who have more affordable housing. In New York City (NYC), rent has increased on average 31% from 2010 to 2018 while income has only increased by 14% in that time. This study aimed to look at the relationship between rising housing prices in the Manhattan borough of NYC and rate of potentially preventable hospital admissions between 2010 - 2019. The CDC defines potentially preventable hospital admissions as acute illnesses or exacerbations of chronic conditions that might not have required hospitalization had these conditions been managed successfully by primary care providers in the outpatient setting. Data were utilized through the New York Statewide Planning and Research Cooperative System (SPARCS), US census data, and median asking rent data for each neighborhood in Manhattan from StreetEasy, a database of real estate listings. Earliest rental data was from January 2010. SPARCS is a collection of de-identified patient-level data for all hospital inpatient stay in the state of New York. Potentially preventable hospital admissions included 8 conditions: diabetes, hypertension, congestive heart failure, angina without procedure, asthma, dehydration, bacterial pneumonia, and urinary infections. The rental data showed that the greatest median rent price change between January 2010 to July 2019 in Hamilton Heights (+57.28%), Battery Park City (+57.14%), and Lower East Side (+50.33%). At the time of the study, SPARCS only had data available for 2010 and 2011 were accessible for viewing as later data was undergoing review and unavailable. As data becomes available, analysis can be done to investigate the relationship of rising rent costs and preventable hospital admissions.

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Community and Urban Health

Barriers to Implementing Adverse Childhood Experience (ACEs) Screening in an Urban Primary Care Clinic

BACKGROUND: Adverse Childhood Experiences (ACEs) are a childhood epidemic, affecting approximately 34 million children nationally and increasing risk for negative health, behavioral, and developmental outcomes. Pediatricians are uniquely positioned to engage families in conversations about childhood adversity and universal ACEs screening can help eliminate selection bias when addressing this topic. Several barriers exist in screening implementation however, leading to questions on how to best incorporate the screen into practice. Objective: Implement a child and parental ACEs screen in a primary care clinic. Identify barriers to screening completion and strategies to increase screening rates. Design: A 17item parent/child ACEs screen was adapted from the Center for Youth Wellness Questionnaire. Screenings were completed from May 2018 to July 2019 at a clinic in Washington, D.C. Screens were administered to caregivers at 6, 12, 24, and 36 month well visits. A quality improvement project was implemented to improve low screening rates. PDSA cycles focused on obtaining provider and clinic leadership feedback, ACEs screening modification to include resiliency measures, and IT adjustments to facilitate data entry. Results: After 14 months, 524 people were screened. The average ACEs screening completion rate was 28% with 34% of children and 60% of parents experiencing at least one ACE. Rates of completion did not change significantly after several PDSA cycles. Majority of providers surveyed (78%, n=7) did not feel ACEs screening had a positive impact on patients. They identified time constraints, work flow issues, screen complexity, fear of re-traumatization, lack of resources, and poor ACEs understanding amongst caregivers as barriers to ACEs screening. Conclusion: Several challenges exist with new universal ACEs screen implementation, thus a trauma-informed system is required for successful implementation. Key stakeholder buy-in that includes parent, staff, provider, and IT support with a clear referral process can improve screening completion and documentation, leading to increased recognition of individual patient risk.

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