Missouri Health Journal

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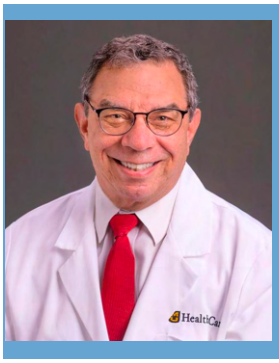

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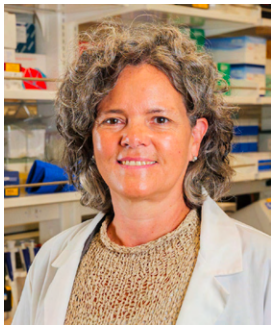

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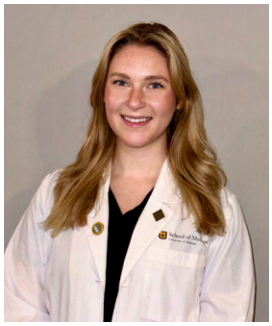

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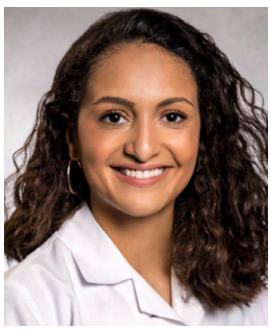

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Introducing *Missouri Health*: Pioneering medical discourse

Jihane Oufattole, Jay Devineni, Sabrina Genovese, Anne Marker, W. David Arnold MD

University of Missouri-Columbia, School of Medicine

In the dynamic world of academia, *Missouri Health* emerges as a transformative force—a journal not just as a periodic release but as a platform reshaping medical publication. Guided by Dr. Richard J. Barohn, Executive Vice Chancellor for Health Affairs at MU Health Care and Dean of the MU School of Medicine, this initiative began as the "Journal of Art, Science, and Diversity" (JASD) in March 2022. An extraordinary response of interest by 28 students, including instrumental contributors like Jay Devineni (M3), Anne Marker (M2), and Sabrina Genovese (M2), set in motion a transformative journey for *Missouri Health*. Adding to the depth of the team, Jihane Oufattole, an M4 with experience from the *RRNMF Neuromuscular Journal*, has recently joined the mission, enhancing editorial capabilities.

Since then, *Missouri Health* has evolved dynamically, anchored in its mission as an open-access journal managed by students for students. The aim is clear: to provide a platform for health professionals and scientists, especially those in their formative training years, to publish groundbreaking research. By eliminating publishing fees and embracing an open-access model, the vision is to create an inclusive space where researchers share ideas without financial constraints.

Aligned with the UM System's NextGen Precision Health Initiative, nested in the MU School of Medicine, *Missouri Healt*h is committed to cultivating the next generation of scientists. Dr. David Arnold, Executive Director of the NextGen Precision Health initiative, has taken on the role of Editor-In-Chief, steering the journal with his expertise. By providing an open avenue for student research, *Missouri Health* strengthens connections between the NextGen Initiative, the public, and bright young minds on the MU campus and beyond.

The journey to *Missouri Health'*s creation involved challenges and collaboration. Logistical hurdles were met with determination. Now, with a fresh name, a distinctive emblem, and a transformed medical student team, we proudly present the inaugural issue of *Missouri Health*—a testament to collaboration, innovation, and the unwavering pursuit of knowledge in the medical realm.

Launching a new academic medical journal: Going back to 1665

Richard J. Barohn MD

University of Missouri-Columbia, School of Medicine

I am thrilled to see the launch of this new publication, *Missouri Health*. This will serve as the MU School of Medicine's academic journal. I think it is important for medical schools to have their own mechanism for publishing scholarly activity and I will explain why in this editorial.

With digital press capabilities it is very doable to develop academic publications. I first learned about academic digital press publishing when I was at the University of Kansas. KU has a digital press office in their main campus library and the staff there help faculty launch journals in their specific academic fields. I believe they have now over 30 journals. Only two are medical. One is the Kansas Journal of Medicine and the other is one I began there called the *RRNMF Neuromuscular Journal* (journals.ku.edu/rrnmf), a neurology subspecialty journal focusing on neuromuscular disorders. We have now published 4 volumes of the neurology journal, on the average 4 or 5 issues a year.

To configure these journals a software program was needed, and OJS was used. Recently the University of Missouri library system acquired the same software system, and I began working with our librarians Christina Pryor and Steven Pryor to develop plans for an online, digital press journal here at our medical school. The idea for the *Missouri Health Journal* was for it to be a general medical journal rather than a specialty journal so that all fields of medicine were welcome.

Our first publication goal was to publish the abstracts from the MU School of Medicine Research Council, Health Sciences Research Day in November. We began talking about this project a couple of years ago and we now are ready to publish Vol 1, Issue 1. It contains many of the abstracts from the Health Sciences Research Day in 2022; soon another issue will contain the abstracts from the research day in 2023. For these abstracts, the student and the student's primary mentor gave permission to publish the abstracts in this journal. The goal, however, is to publish more than just abstracts from our annual research day meetings.

The second publication aim is to have manuscripts submitted by our students, residents, fellows, and faculty

to *Missouri Health*. We want to encourage the students and trainees who present projects at research day to work with their scientific mentors to turn the abstracts into a manuscript that can be considered for publication. An editorial board will send these out for peer review, predominantly among our faculty but we can also use reviewers from outside MU of course.

We have asked for medical student volunteers and we have several of them who are serving as student managing editors. I have asked Dr. Dave Arnold to serve as the Editor-In-Chief and Dr. Scott Rector and Dr. Bettina Mitttendorfer to serve as Associate Editors. We have also asked each department in the SOM to have one faculty designated to be an editor for manuscripts in their field. They will work closely with the student managing editors and help triage the submissions to send them out to appropriate reviewers. How many issues get published each year is up to the volume of submissions. Only time will tell. We do not have a set pre-determined number of issues in mind.

Missouri Health, like the *RRNMF Neuromuscular Journal*, is free and open access. There is no charge to authors to submit and publish. Charging authors is a practice which commonly occurs in open access journals today. In addition, the authors own the copyright of everything that is published. The publisher does not own the copyright. This is a very different concept from current publishing practices. I think this is important for several reasons that I outlined in my opening editorial in the RRNMF Neuromuscular Journal Vol 1: Issue 1 in May 2020 (1).

The current world of scientific and academic publishing is controlled by a small number of large publishing companies for the legitimate journals. Then there is a large subculture of predatory open access journals that are not of high caliber. What both have in common is that to publish a journal as open access, large fees are required, often from $1,000 to $4,000 dollars. This money goes to the publishing companies.

In former times, it was the money garnered by subscriptions that supported a journal. Then publishers were able to obtain from advertisements, especially from pharmaceutical companies. But subscription prices have increased dramatically, and it has become increasingly difficult for libraries and individuals to continue purchasing subscriptions from publishers. At the same time, the publishing companies added on a new fee to authors if they want to get a manuscript published. Many new journals that required publishing fees have proliferated and are predatory, inducing faculty that have a desperate need to publish for academic viability to pay onerous fees.

One solution is for academic medical schools and medical centers to take control of this situation and begin publishing their own academic publications. Now that software such as OJS is available to help format and organize a pathway for an academic journal, the only thing that is needed is the will of a few individuals to get it done. Fortunately, at the University of Missouri, we have that issue under control with our medical students, faculty, librarians, and staff. Only a handful of medical schools have taken the plunge to begin publishing their own academic journals. I am very pleased that the University of Missouri School of Medicine is now one of them. If all 150 medical schools developed their own academic publications, and all of the medical schools worked together in the peer review process to help each other get reviews done, academia can regain control of the academic publishing operation, as it did when the first scholarly scientific publication was published in England in 1665, *Philosophical Transactions of the Royal Society*; the world's first scientific periodical, which was developed, written and controlled by scientists (2,3).

1. Barohn RJ. Letter from the Founding Facilitator. RRNMF Neuromuscular Journal 2020;1(1):1-25

2. Tinniswood, Adrian. The Royal Society & the Inventory of Modern Science. Basic Books, New York, NY, 2019.

3. Bryson, Bill. Seeing Further: The Story of Science, Discovery, And the Genius Of The Royal Society. HarperPress, New York, NY, 2010.

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A systematic review investigating rates of maternal mortality in African countries

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Introduction

The goal of this review is to investigate maternal mortality rates (MMR) in African countries. Because the MMR of Black women in the United States is 3-5x higher than in White women, this study aims to identify if a similar racial disparity is present in Africa. It also explores factors contributing to high MMR including socioeconomic status, age, comorbidities, ethnicity, and access to healthcare.

Methods

Four bibliographic databases were searched for a variety of terms including “maternal mortality”, “ethnic groups”, and “racial disparities”. Inclusion criteria were manuscripts which discussed African countries; exclusion criteria included “wrong outcome” and studies only discussing maternal morbidity. An organized and structured approach was completed to evaluate the quality of papers. All studies included were rated as either “poor”, “okay”, “good”, or “excellent”.

Results

Tunisia (1,820/100,000), Sierra Leone (1,800/100,000), Somalia (1,600/100,000), and Guinea (1,600/100,000) have the highest average MMR. The most common factor associated with mortality was preeclampsia/eclampsia. HIV was correlated with higher mortality rates, as well as low socioeconomic status (SES) and/or advanced maternal age.

Conclusion

Southern African countries tend to have the lowest recorded MMR whereas countries in East Africa tend to have the highest MMRs on the continent. Many comorbidities contribute to mortality among pregnant women throughout Africa, including HIV, SES, extremes of maternal age, and access to trained healthcare professionals. This study shows a need for further research regarding differences in perinatal care across countries to help identify specific factors leading to the large differences in MMR across the continent.

Effects of an eight-week personalized functional food diet on cardiovascular health in individuals with overweight and obesity

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Introduction

Epidemiological evidence indicates that dietary intake modulates cardiovascular health. Consuming functional foods such as fruits, vegetables, and nuts is positively associated with improved health outcomes. However, the long-term effects of personalized dietary interventions incorporating functional foods on cardiovascular outcomes such as endothelial function, arterial stiffness, and blood pressure in overweight and obesity are not well-studied.

Methods

Young adults (n=58, age: 18-35 years) with overweight and obesity (BMI: 25- 45 kg/m^2) were randomized to either the personalized functional food diet (PD) or conventional dietary advice (CD) group. Participants in PD group received personalized dietary counseling throughout the study and were provided with fruits, vegetables, and nuts to consume, while those in CD group received conventional dietary advice at the beginning of the study only. Reactive hyperemia index (RHI, a measure of endothelial function), augmentation index (AI, a measure of arterial stiffness), and blood pressure were assessed at baseline (BL) and at the end of the 8-week intervention (W8). Linear mixed model analyses with subgroup analyses were conducted on transformed variables to determine statistically significant differences.

Results

The mixed-effect analyses showed no statistically significant diet and time interaction effects for RHI, AI, and systolic and diastolic blood pressure. However, subgroup analyses indicate an increase in RHI over the 8-week intervention with PD ($p<0.05$).

Conclusion

Our preliminary data suggest that personalizing diets could potentially improve endothelial function. The clinical trial is currently underway, and the trend observed at this preliminary stage for RHI could elicit statistically significant differences with a larger sample size.

Developing a noninvasive optogenetic stimulation approach to treat dysphagia in ALS

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Ilker Ozden INP,[1,2] Teresa Lever[1,3]

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[2]Department of Biomedical, Biological and Chemical Engineering
[3]Department of Otolaryngology-Head and Neck Surgery

Introduction

Amyotrophic lateral sclerosis (ALS) is a fatal disease characterized by gradual deterioration of motor neurons, including those controlling swallowing. As a result, nearly all patients develop progressive swallowing impairment (dysphagia) that ultimately leads to feeding tube dependence for survival. The nucleus tractus solitarius (NTS) in the medulla coordinates the swallowing reflex based on direct sensory input from the pharyngeal/laryngeal mucosa via the superior laryngeal nerve (SLN). This project explores the feasibility of applying a minimally-invasive optogenetics approach in a mouse model of ALS to activate SLN nerve endings in the pharyngeal/laryngeal mucosa and upstream NTS neurons to facilitate swallowing.

Methods

Retrograde viral vector AAV9.CAG.hChR2(H134R)-mCherry for expression of the excitatory opsin ChR2 was applied to the pharyngeal/laryngeal mucosa of anesthetized ALS mice (n=8) for uptake by SLN terminals and subsequent retrograde targeting of the nodose ganglia (SLN cell bodies) and NTS bilaterally. After allowing 3 weeks for ChR2 expression, pulsatile light stimulation was applied to the pharyngeal/laryngeal mucosa of anesthetized mice via endoscopic guidance to evoke the swallowing reflex.

Results

Optogenetic stimulation of the pharyngeal/laryngeal mucosa did not elicit swallowing. Subsequent histological examination of the SLN and NTS did not reveal ChR2 expression.

Conclusion

Results suggest that the viral vector did not cross the mucosa and/or was not expressed in the SLN and NTS. Further study is underway, including experimentation with cholera toxin B (CTB), which is known to cross the mucosa and may aid in the development of an effective ChR2 vector.

Fatal untreated meningioma in a prisoner

Mira Basuino,[1] Keith Norton MD,[1-3]
Carl Stacy MD,[1-3] Keith Norton MD,[1-3]
Deirdre Amaro MD,[1-3] Douglas C Miller MD PhD[1-3]

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[2]Department of Pathology & Anatomical Sciences
[3]Office of the Medical Examiner of Boone and Callaway Counties

Introduction

A 41-year-old incarcerated woman was found dead. She had frequently complained about severe headaches and had seen a physician for those, associated visual disturbances, and hypertension on multiple occasions between July and October 2021. She was never referred for a CT or MRI scan of her head.

Methods

A complete forensic autopsy was performed including neuropathological consultation.

Results

When the skull was opened a 3.5 x 1.0 x 1.0 cm mass of rubbery soft tissue was found on the inner surface of the anterior frontal skull base dura, compressing the frontal and temporal lobes and also invading the lesser wing of the left sphenoid. The swollen brain had significant left to right herniation with subfalcine herniation, and significant cerebellar tonsillar herniation. Axial sections of the brainstem showed a linear Duret hemorrhage in the dorsolateral midbrain-pontine junction. Histological examination of the dural mass demonstrated a WHO grade 1 meningioma.

Conclusion

Grade 1 meningiomas are not usually fatal, but the potential for such an outcome exists when appropriate medical care is withheld. The failure to obtain a CT scan of this woman's head led to an otherwise wholly preventable death as the meningioma grew to such a size that it caused cerebral edema, herniations and ultimately cardiac or respiratory failure.

Covered endovascular self-expanding stents for femoropopliteal disease

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[4]Department of Vascular and Endovascular Surgery

Introduction

The ideal endovascular treatment of femoropopliteal disease is unknown. We report outcomes of patients undergoing covered stents for femoropopliteal disease.

Methods

Patients undergoing covered stent placement for femoropopliteal disease were identified (2017-2021). Chi-square and Kaplan-Meier analysis were used to evaluate outcomes.

Results

Sixty-two patients underwent covered stent placement; 24 women (39%) and 38 (62%) men with mean age 63. Most interventions were performed for acute or chronic limb-threatening ischemia (55%) with mean ABI of 0.47 and mainly TASC C/D lesions (69%). Prior femoropopliteal (SFA) intervention occurred in 45% with mean lesion length of 232 mm. Isolated SFA stenting occurred in 48 patients (77%) with Iliac/SFA in 11 patients (18%) and SFA/tibial intervention in 3 patients (5%). At a mean of 21 months, five patients died (8%), 10 patients suffered acute limb ischemia (16%) with 6 patients underwent amputation (10%). Univariate analysis revealed reinterventions in 10 patients (16%) at a mean of 5.6 months, associated with longer index surgery duration (110 vs. 146 minutes;p=0.04) and smaller size of original SFA stent used (5.9 vs. 6.23;p=0.04). Similarly, occlusion occurred in 24/62 patients (39%) at a mean of 2.3 months, associated with balloon size (5.7 vs. 6.1 mm; p = 0.02) and amputation (5 vs. 1 patient(s); p=0.03). Primary patency was 55% with secondary patency of 92% at 40 months (Figure 1).

Conclusion

For medically-unfit patients with prior intervention for complicated SFA lesions and limb threat, excellent mid-term secondary patency and reasonable amputation rates can be obtained with covered stents for limb-salvage.

Association between health-related quality-of-life measures with bladder cancer characteristics and survival outcomes in older bladder cancer patients

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Introduction

We have investigated whether the bladder cancer characteristics have any effect on the Health-Related Quality-of-Life (HRQoL) measures in older bladder cancer patients. This analysis improved the understanding and expectation management of these patients when making decisions on how to proceed with treatments.

Methods

Data was obtained from patients with a diagnosis of BC in the SEER-MHOS database (age≥65), from 1998 through 2020. We applied unsupervised machine learning algorithms to empirically identify the homogenous clusters of elderly bladder cancer patients with similar HRQoL (measured by PCS, MCS, and ADLs). Log-rank test was used to assess the association of the clusters with survival outcomes. We investigated whether the bladder cancer characteristic such as staging, surgical treatment, and time of diagnosis has any association with the identified clusters.

Results

The chi-squared test indicated significant differences among clusters with respect to demographics, and socioeconomic variables (except smoking status p=0.26). We observed significant differences in outcomes such as Depression and Fall. The log-rank test from Kaplan Meier shows significant differences in survival probability among clusters. We did not find any significant difference in cancer characteristics variables such as cancer staging (P=0.12) and surgical type (P=0.07) and time from first cancer to survey (P=0.50) among the different clusters.

Conclusion

Although clusters significantly differ in demographics, socioeconomic, and survival outcome, they did not differ by BC characteristics such as cancer staging and the surgical type and time from first cancer to survey. This suggests an independent association of patients' HRQoL, with the bladder cancer characteristics.

Drosophila eye pigmentation assay of histone lysine-specific demethylase 1 (LSD1) for botanical modulators of human neuronal function (autism), cancers, infections, and immunity

Bertarelli I, Diehl J, Frees G, Hanley A, Prussman A, Schoenig E, Stefani L, Turner J, Williams C, Yarovinski S, William R. Folk PhD,[1] Chi PL, Hien BM, Hiep NV , Khanh NVA, Mai NTP, Nhat PT, Ngan TH, Oanh HV, Quan DV, Quynh TTD,Yen NTH, Hang PTN PhD[2]

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Introduction

LSD1 targets methylated histone H3K4 and H3K9 and non-histone substrates for regulating gene expression in normal development and homeostasis in a variety of human health conditions (e.g., autism, multiple cancers and infections). LSD1 is related to monoamine oxidases (MAO) and is evolutionarily conserved across many species and epigenetically regulates the *white* locus controlling transport of biogenic amines and eye pigmentation in *Drosophila melanogaster white mottled* mutants. Here we quantify eye pigmentation to assess botanicals that may modulate LSD1 and other genes to affect neurodevelopment and behavior.

Methods

D. melanogaster were raised at 25C on standard media (+/-botanical supplement). Adults were collected, frozen, decapitated and heads suspended in acidified ethanol for 24h, then centrifuged and A_{480} measured.

Results

Eye pigmentation (A_{480}) of wild type flies under our growth conditions was ~tenfold increased over that of *In(1)w[m4] white mottled* adult flies raised on media without supplements. Tranylcypromine, a pharmacological inhibitor of LSD1, severalfold increased pigmentation of the *In(1)w[m4] white mottled* flies and also of wt flies, indicating the *white* locus pigment transporter is constitutively repressed by LSD1. The flavone quercetin (also an LSD1 inhibitor) increased pigmentation. Extract of the botanical *Ilex kudingcha* that alters autism-like properties significantly increased eye pigmentation of the *In(1)w[m4] white mottled* F1 generation flies but not wt flies.

Conclusion

Eye pigmentation offers a facile, quantitative assay of botanicals that may provide novel treatments of autism and other health conditions modulated by LSD1.

Patient factors associated with proper adjuvant treatment for high-risk oral cavity cancer

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Introduction

Patients with high-risk resected oral cavity squamous cell carcinoma (SCCa) should undergo treatment with concurrent radiation and high-dose cisplatin for optimal oncologic outcomes. Recent studies indicate that patients who receive at least 200 mg/m^2 of cisplatin have improved outcomes, but the factors associated with receiving such doses are understudied.

Methods

Retrospective cohort study. Patients were identified from an IRB-approved University of Missouri collaborative database of head and neck cancer. Patient demographics and characteristics were collected. Details of patient counseling including whether patients met with university radiation and medical oncologists were collected. Univariable and multivariable logistic regression analyses with high-dose chemotherapy as a binary outcome were performed.

Results

57 patients met inclusion and exclusion criteria. Twenty-four patients received at least 200 mg/m^2 of adjuvant cisplatin chemotherapy, while 33 did not. Patients who received high-dose chemotherapy were more likely to have met with university medical oncology than those who did not receive high-dose chemotherapy (71% vs. 30%), even if patients did not receive adjuvant treatment at the University of Missouri. The only examined factor associated with receipt of high-dose chemotherapy was meeting with university medical oncology (OR 7.15, 95% CI 2.10- 29.0). There was no detectable difference in survival in this small cohort study.

Conclusion

A significant proportion of patients with resected high risk oral cavity SCCa do not receive high- dose adjuvant chemotherapy. Meeting with university medical oncology for counseling may be protective against off-guidelines treatment. Future prospective studies may investigate this effect.

The role of the p2y$_2$ receptor in gefitinib resistance in the CAL27 human oral squamous cell carcinoma

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Introduction

Targeting cell-surface proteins like the epidermal growth factor receptor (EGFR) with gefitinib, an FDA-approved tyrosine kinase inhibitor (TKI), is an effective chemotherapeutic approach for treatment of various cancers. However, the use of TKIs has not proven beneficial in clinical trials for head and neck squamous cell carcinomas (HNSCCs), due to the prevalence of acquired drug resistance that arises from EGFR mutations and aberrant activation of signaling pathways downstream of EGFR, including the mitogen-activated protein kinase (MAPK) cascade, which stimulates cancer growth. Thus, cellular mechanisms activating EGFR or enhancing MAPK signaling to stimulate tumor growth represent mechanisms to circumvent TKI activity, contributing to acquired drug resistance. We hypothesized that the P2Y$_2$ nucleotide receptor (P2Y$_2$R) contributes to TKI resistance. The P2Y$_2$R is a G protein-coupled receptor activated by extracellular nucleotides (*i.e.*, eATP and eUTP), which stimulates EGFR/MAPK signaling.

Methods

We utilized human CAL27 HNSCC cells and a P2Y2R knockout cell line (CAL27.C6) generated using CRISPR/Cas9. We compared gefitinib sensitivity of CAL27 and CAL27.C6 cells by subjecting each cell line to long-term exposure with an increasing concentration of gefitinib, and changes in P2Y$_2$R function and gefitinib sensitivity were assessed.

Results

Results indicate that CAL27 cells are more sensitive to gefitinib than CAL27.C6 cells. Both cell lines exhibited increased sensitivity to gefitinib and enhanced UTP-induced ERK phosphorylation following long-term gefitinib treatment.

Conclusion

Results reveal that P2Y$_2$R contributes to gefitinib resistance and thus identify P2Y$_2$R antagonism as a potential therapeutic approach to sensitize tumors to TKI chemotherapeutics for the treatment of HNSCCs in humans.

Feasibility of transcutaneous vagal nerve stimulation as anxiety therapy in youth with ASD

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Introduction

This pilot study evaluates the feasibility of transcutaneous vagal nerve stimulation (tVNS) as a non-pharmacological, minimal-risk anxiolytic therapy in children and teens with autism spectrum disorder (ASD). Youth with ASD frequently suffer from pharmacologically resistant anxiety. tVNS offers a non-invasive method of decreasing sympathetic overactivation that contributes to anxiety. tVNS has been studied in adult and pediatric populations with various neuropsychiatric conditions but not as anxiety treatment in youth with ASD.

Methods

This is an open-label feasibility trial involving participants aged 7-17 with diagnosed ASD. Baseline anxiety was assessed using the Revised Childhood Anxiety Sensitivity Index (CASI-R) with moderate or high anxiety scores required for participation. Caregivers administered a pre-programmed 60-minute stimulation to their child nightly for two weeks. Compliance was defined as nightly device engagement of at least 80% of the trial duration. After two weeks, assessments were repeated in addition to the Clinical Global Impression – Improvement Scale (CGI-I).

Results

Of the fifteen enrolled participants, ten were included in data analysis, two participants failed the baseline anxiety requirement, one withdrew consent pre-treatment, and two were non-compliant. Mean compliance was 87% with largely positive participant and caregiver feedback. Technical difficulties most contributed to non-compliance. Average scores on the CASI-R decreased by 7.9 points (*SD* = 6.3). The median impression on the CGI-I was “minimally improved” anxiety.

Conclusion

tVNS therapy in youth with ASD is feasible with potential anxiolytic benefits. The results of this pilot study will inform larger, randomized control trials assessing the efficacy of tVNS.

Quality improvement of patient-centered lab result communication through the Clinic Manager Communication Log (CMCL) at Medzou Community Health Clinic

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Introduction

Timely communication of lab results is vital to healthcare delivery. To improve patient care practices, the Clinic Manager Communication Log (CMCL) was implemented at student-run MedZou Community Health Clinic - a free clinic serving uninsured patients in Columbia, Missouri. Without a streamlined system in place, there were delays in reporting lab results and communications to patients. Current literature doesn't identify solutions to this issue in underserved populations.

Methods

Using an Ischikawa Diagram and mapping workflow, a 2x2 Effort vs. Yield table was constructed to determine the best protocol to report labs. As a result, the CMCL was created to track all patient lab communication and follow-up needs. Clinic Managers changed protocol by contacting patients thrice within 1 week, recording call attempts and information shared between January to August 2022. Retrospective data was collected to calculate turnaround time in reporting lab results prior to CMCL implementation. A patient communication satisfaction survey was utilized to assess feedback.

Results

Before CMCL implementation, 53.3% of patients never received their results. Using the CMCL, there was a 31% increase in patients receiving lab results and a 12.6% increase in results communicated within a week. Out of patients who couldn't be reached initially, two-thirds obtained results via a follow-up call. 76% of patients rated their communicative experience as "Excellent."

Conclusion

The CMCL demonstrates how tracking communication is effective at improving patient care at student-run clinics. A similar model of centralized data collection can be used to ensure reliable and efficient patient follow-up.

Social story visual aid to improve barriers to childhood vaccinations

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Introduction

With children, visual aids are a vital resource in communication and behavioral modification in times of stress. Vaccinations are one of the most common sources of iatrogenic stress in childhood. This stress is a barrier to receiving recommended vaccinations. This study evaluates the role of a social story visual aid in decreasing the child's anxiety and improving the overall vaccination process.

Methods

Children scheduled for 4-5-year-old preventative visits were invited to participate. Child-Caregiver dyads received the Immunization Story before their visit. Nursing behavior mirrored the Immunization Story during vaccine administration. Measures of distress were completed by the child, parent, and nurse. Parents and nurses also evaluated the visual aid.

Results

Pain/distress rating assessment scores were grouped based on Feelings Chart scores as "Good" (score 1 or 2), "Ok" (score 3 or 4), and "Bad" (score 5). Post-vaccination stress reporting demonstrated variability based on respondent type. Nurses found the visual aid showed 40% better reactions compared to without visual aid use. Parents reported 30% better stress levels during this vaccination than previous, and 70% were likely to utilize the visual aid next time.

Conclusion

This is a novel pilot feasibility study evaluating the use of a social story and its effectiveness in reducing pain/stress in 4-5-year-olds receiving recommended vaccinations. The findings suggest a positive correlation between visual aid use and effective decrease in pain/distress. A larger sample size is needed to evaluate the tools effectiveness more broadly.

COVID-19 vaccine hesitancy in the United States: Root causes and potential solutions

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Introduction

The Coronavirus Disease 2019 (COVID-19) pandemic has devastated communities across the globe, causing over 6.5 million deaths worldwide, with the United States (U.S.) comprising over one million of these mortalities. In the U.S., four vaccines have been federally authorized to help control the pandemic. While immunization minimizes the likelihood and severity of Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) infection and vaccine manufacturers implement rigorous quality-control measures, vaccine hesitancy continues to pose a threat to public health. Reluctance to vaccinate differs among subgroups of the U.S. population where factors such as race, gender, age, socioeconomic status, employer support, religion, and political affiliation play an important role. Moreover, inequitable access to vaccines, fear of adverse effects, widespread misinformation, and general mistrust of the health care system, the government, and pharmaceutical companies undermine vaccination efforts. Though the roots of vaccine hesitancy are complex, it is an important issue to address as it has profound impacts on human well-being, the health care system, and the economy at large.

Methods

PubMed and Google Scholar were searched to identify the root causes of COVID-19 vaccine hesitancy and evidence-based solutions that have improved vaccine uptake for the COVID-19 vaccine as well as other vaccines.

Results

Historical inequities, ongoing systemic racism, higher rates of chronic medical conditions, reduced healthcare access, and increased educational barriers have contributed to vaccine hesitancy among minority communities, particularly Black Americans. Right-wing political affiliation is another major determinant of vaccine hesitancy, with deep-seated religious beliefs, conspiracy theories advanced by right-wing media, and opposition to public health regulations all underpinning science skepticism and contributing to lower threat perception of the virus. In addition, individuals with a high-school-level education or less are more likely to express vaccine hesitancy when compared to those with higher levels of education due to a lack of knowledge about the science of vaccines, misunderstanding of the vaccine approval process, and difficulty contextualizing the adverse effects of the vaccines. Potential solutions to vaccine hesitancy in these groups include utilization of trusted messengers, investment in grassroots vaccination, simpler presentation of data, monetary and non-monetary incentives, and addressing systemic inequities.

Conclusion

Many Americans express low threat perception of COVID-19, concern for vaccine adverse effects, and susceptibility to misinformation. There are, however, clear demographic lines between those who are vaccinated and those who remain vaccine hesitant, where the unvaccinated are disproportionately non-college educated, minority, and self-identify as politically conservative. Reaching these communities will require integrated, community-based interventions.

The management of intraocular pressure: Comparing the outcomes of patients treated with cyclophotocoagulation (CPC) and those treated with primary micropulse cyclophotocoagulation (MPCPC) followed by CPC. A retrospective analysis.

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Introduction

Cyclophotocoagulation (CPC) is a well-studied procedure for the treatment of glaucoma. It involves the use of a diode laser to ablate the ciliary body of the affected eye, resulting in the reduction of intraocular pressure (IOP). The development of micropulse cyclophotocoagulation (MPCPC) offers a potentially safer option for patients. Our goal was to analyze the IOP-lowering success rate and complication rate of CPC alone compared to CPC performed after prior MPCPC.

Methods

IRB approval was obtained through the University of Missouri (IRB#2089182). A retrospective chart review of 41 total eyes was performed. Twenty eyes were treated with CPC alone and 21 were treated with CPC after prior MPCPC. Treatment success was defined as a final IOP of $\leq$20 and a $\geq$20% IOP reduction using the same or fewer medications after 3 months. The rates of treatment success and complications were analyzed using chi-square analysis.

Results

Treatment success was observed in 60% of eyes treated with CPC, and 33% of eyes treated with
CPC after prior MPCPC. No statistical difference was found between the two groups in either the rate of success ($p=0.122$) or complications ($p=1.0$)

Conclusion

As MPCPC is a relatively new procedure, an analysis of patient outcomes after CPC in patients who previously had MPCPC has not been performed. While our analysis showed a trend toward greater success with CPC when prior MPCPC had not been performed, this was not shown to be significant, and no difference in complication rate was observed. Further evaluation with a larger patient population is warranted to confirm these results.

Subchorionic lead exposure incudes molecular and growth changes in renal cell carcinoma mouse tumors

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Introduction

Kidney cancer accounts for 2% of all cancer diagnoses and deaths worldwide. Of new diagnoses, 16% are metastatic; these cancers have a 5-year survival rate of just 12%. This is much lower than the 5-year survival rates for localized and regional cancers, which are 92.5% and 69.6% respectively, that make up 82% of new diagnoses. We hypothesized that subchronic exposure to low doses of lead would induce molecular and morphological changes in RCC similar to those in other metastatic cancers.

Methods

Following subchronic challenge of Renca cells with lead acetate (10 passages, 0.5 mM), control and lead cells were injected subcutaneously ($5x10^5$ cells/100 ml) into the hindflank of male and female mice. Tumor growth was assessed over 28 days.

Results

Lead challenged cells exhibited significant increase in growth in male, but not female mice tumors as compared to control cells. Lead induced a heterogenous decrease in E-cadherin and BMP-7 in both males and females, while tumor fibrosis was increased fibrosis in female mice in the lead challenged cells.

Conclusion

Loss of E-cadherin and BMP-7 expression correlates with a decrease in cell-
cell aggregation and increase in cellular migration and invasion. An increase in picrosirius red stain in female samples suggests sex hormones may play a factor in the fibrosis of RCC metastases. These are consistent with phenotypic markers of EMT and support a role of lead in RCC progression, encouraging further research utilizing tumor graft models.

Rare case of gastropericardial fistula after Roux-en-Y gastric bypass

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Introduction

Roux-en-Y gastric bypass is widely used in the management of morbid obesity. An extremely rare but life-threatening complication is the formation of a gastropericardial fistula. We present a case of a gastropericardial fistula occurring four years after a Roux- en-Y gastric bypass.

Case Description

We present a case of a 51-year-old male who initially presented in 2018 with morbid obesity and underwent an uncomplicated robotic assisted Roux-en-Y gastric bypass. He had a normal postoperative course with uncomplicated follow up. He presented to the ED in June 2022 with acute worsening of abdominal pain of five-month duration. Upon presentation, he was afebrile with normal vital signs. Imaging revealed a perforated marginal ulcer with abscess cavity extending from the diaphragm to the pericardium with associated pericardial abscess. The patient was taken to the operating room where he underwent a diagnostic laparoscopy and left-sided thoracotomy with placement of pericardial drain and endoscopic stent across the ulcer. He progressed in normal postoperative fashion and was discharged home on POD 6. On 7/23, patient presented to the ED with recurrent abdominal pain and emesis. Imaging revealed partial proximal bowel obstruction secondary to stent migration. He was taken back to the operating room and underwent diagnostic laparoscopy with stent removal. His postoperative course was relatively unremarkable, and he was discharged home on POD 8.

Discussion

Gastropericardial fistulas are extremely rare. This case illustrates a gastropericardial fistula as a late complication of a Roux-en-Y gastric bypass, of which few have been reported.

Persistent meningeal signs despite previous treatment for cryptococcal meningitis – A case report

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Introduction

Cryptococcal meningitis continues to be a life-threatening fungal infection in patients with HIV. Treatment involves a year of antifungal therapy and persistent meningeal signs months after treatment initiation are uncommon.

Case Description

We report a case of a 29-year-old male with HIV who was diagnosed with cryptococcal meningitis in January 2021. He had been diagnosed with HIV in 2017 and was treatment naïve at presentation. He underwent, induction, maintenance and consolidation therapy for his fungal infection and antiretroviral therapy (ART) over the span of ten months. However, subsequently, he continued to have persistent headaches and routinely received therapeutic lumbar punctures alongside follow up. In November 2021, he was admitted due to new and worsening meningeal signs. Imaging revealed leptomeningeal enhancement. Despite elevated cryptococcal antigen titers, cryptococcal cultures continued to be negative and paradoxical immune reconstitution inflammatory syndrome was considered higher in the differential as compared to cryptococcal disease.

Discussion

This case discusses the importance of keeping both immune reconstitution inflammatory syndrome and a cryptococcal meningitis relapse in the differential diagnosis for patients with persistent meningeal signs. This differentiation is vital as the management and outcome of the conditions are different and can be contradictory.

In-vitro fertilization (IVF), intracytoplasmic sperm injection (ICSI) and "rescue ICSI"

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Introduction

Intracytoplasmic sperm injection (ICSI) was introduced as a technique to fertilize oocytes with in male-factor infertility cases. ICSI provides a fertilization rate of 65.3% in comparison to 48.1% with "traditional" in-vitro fertilization (IVF). It's use has broadened to include patients without male-factor infertility as ICSI decreases the rates of fertilization failure and several studies demonstrate comparable implantation and live birth rates to IVF. However, it's potential over-utilization has been questioned given studies demonstrating associations with congenital malformations, imprinting disorders and cognitive developmental abnormalities. Thus, the decision to pursue ICSI, especially for cases of non-male factor infertility has been controversial.

Methods

Case series of three patients undergoing ART with very-low fertilization rates after conventional insemination, all of which led to attempted "rescue ICSI" procedures. A literature review was performed to assess current trends in ICSI use, association with congenital anomalies, and a comparison of fertilization, pregnancy, and live birth rates between ICSI and IVF.

Results

Three patients (2019-2022) underwent IVF, with unexpectedly low fertilization rates of 0%, 9.5%, and 10.5%. "Rescue ICSI" was performed, with several resulting embryos and one likely live birth from these rescue ICSI embryos to date.

Conclusion

The literature on the association between ICSI and congenital anomalies is inconsistent. ICSI has similar live birth rates and fewer "failed fertilizations" minimizing the financial and psychosocial stressors associated with a failed IVF cycle. Recent experience has resulted in a practice change in which all IVF patients at the University of Missouri are strongly encouraged to utilize ICSI.

Comparison of relative value units per operative time between anterior cervical discectomy and fusion (ACDF) vs cervical disc replacement (CDR)

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Introduction

Anterior cervical discectomy and fusion (ACDF) has been the gold standard for surgical treatment of cervical radiculopathy for many years. Recently however, cervical disc replacement (CDR) has become an alternative to treat cervical radiculopathy and myelopathy. Data supports favorable outcomes for both myelopathy and non-myelopathy use of disc arthroplasty. It is important to assess and contrast all aspects of the two procedures to compare their strengths and weaknesses and assist surgeons in procedure selection.

Methods

Retrospective study including patients treated at the University of Missouri Hospital and the Missouri Orthopaedic Institute from 2019-2022. Patients will be identified via CPT codes used for 1-level ACDF and CDR and data will be extracted via chart review.

Results

The total patient cohort consisted of 361 patients. 124 patients met inclusion criteria, but of these patients only 33 underwent a CDR. Due to the relatively smaller CDR patient population, data analysis was collected on the most recent 33 ACDF operations to keep the two groups of comparable size. The mean RVU per hour for ACDF was 24.525 while the mean RVU per hour for CDR was 13.552258.

Conclusion

ACDF was associated with significantly higher RVUs per minute compared to
CDR. These findings provide evidence for assessing physician reimbursement and correlated outcomes of surgical treatment options for cervical spine arthroplasty.

Stakeholder-informed design and development of the commitfit electronic health record tool

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Introduction

CommitFit is a novel adolescent healthy lifestyle mobile health application (mHealth) designed to synchronize with the electronic health record (EHR). Current studies on EHR tools for mHealth apps are limited. Developers would benefit from provider preferences.

Methods

Using a mixed method user-centered approach, we recruited MU pediatric and family medicine providers to participate in focus groups conducted virtually on Zoom© and emailed surveys. We used rapid assessment qualitative analysis and descriptive statistics of surveys to understand provider preferences of the CommitFit data visualization. Results from the first two of three focus groups will be reviewed here. An emailed survey of a larger sample of providers is pending.

Results

A total of 12 providers who care for adolescents in clinic participated. Rapid analysis revealed a preference for an aesthetically pleasing design that allows rapid review of logged lifestyle behaviors, as well as a graph that displayed weight and blood pressure percentages or labs over time. More than 83% preferred inclusion of BMI percentile, current weight in pounds, change in weight/BMI percentile, and data presented in weekly averages. Greater than 90% viewed the CommitFit EHR tool as relevant, valuable, and simple to use. Most believe it will improve communication and facilitate care.

Conclusion

Most providers in our study favorably reviewed the CommitFit EHR visualization. Preliminary data review suggests that core components of EHR adolescent lifestyle tools should include changes in weight/BMI percentile, current weight in pounds, visualizations of progress, and data presented in weekly increments.

Smooth muscle cell specific Beclin-1 deficiency accelerates ascending and abdominal aortic aneurysms in mice

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Introduction

Ascending and abdominal aortic aneurysms (AAs) are permanent dilations of the aorta with 80% mortality after rupture. Vascular smooth muscle cells (SMCs) maintain aortic structural integrity, and SMC-rich aortic media is disrupted in AAs. Autophagy is a self-regulatory process by which cell digest, and recycles their cytoplasmic materials for energy purposes under stress. Recent clinical studies highlighted that Beclin-1, an autophagy induction gene, is highly upregulated in AA tissues from patients. Using Angiotensin II (AngII) infusion model of AAs, we examined the functional contribution of SMC-derived Beclin-1 during AA development in mice.

Methods

Mice with inducible deletion of Beclin-1 in SMCs were produced by breeding male mice hemizygous for Acta2-Cre^{ERT2} (Cre+) to female Beclin-1 floxed mice. At 8 weeks of age, male Beclin-1 x Acta2-Cre^{ERT2} (Cre+) and non-Cre littermates (Cre-) mice were injected with tamoxifen (75mg/kg, i.p.) for 5 days. To study the role of SMC- Beclin-1in AAs, male Cre+ and Cre- (n=6-7 per group) mice were infused subcutaneously with either saline or AngII (1,000ng/kg/min) by osmotic mini-pumps for 4 weeks.

Results

Western blot analyses showed depletion of Beclin-1 protein in the aortic media from Cre+ mice compared to Cre- littermates. Interestingly, ultrasound and ex-vivo maximal diameter measurements demonstrated that depletion of Beclin-1 in SMCs by itself significantly accelerated ascending, arch, descending and abdominal aortic expansion in mice. (Cre-: 1.0 ± 0.02 mm, Cre+: 1.5 ± 0.14 mm; $P<0.001$).

Conclusion

These findings demonstrate that SMC-Beclin-1 plays a critical role in suppressing ascending and abdominal aortic aneurysm formation in mice.

Examining the role of the aryl hydrocarbon receptor in the regulation of CD36 expression in the CNS

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The aryl hydrocarbon receptor (AHR) is a transcription factor that regulates the expression of genes involved in cell proliferation, differentiation, and apoptosis. AHR can be found expressed by lymphocytes, alongside hepatocytes, and tissue structural cells like epithelial and stromal cells in the gut, skin, and lungs. This receptor regulates genes involved in the metabolism of drugs and other xenobiotic compounds as well as endogenous ligands like dietary microbiota-derived amino acids, indole metabolites, and plant flavonoids. In the central nervous system (CNS), AHR controls CD4+ T regulatory and T helper 17 differentiation to regulate host immune responses, host-microbiome symbiosis, and recent studies suggest that it functions as a physiological regulator of myelination and plays a role in the sexual dimorphism of CNS autoimmune demyelination, a pattern seen in multiple sclerosis (MS). MS is an autoimmune disease that targets the CNS, where lymphocytic infiltrates and macrophages degrade the myelin sheath that surrounds neurons. In the neurovascular unit, the fatty acid translocase CD36, is expressed in cells like macrophages, microglia, astrocytes, and neurons to facilitate uptake of lipid molecules and transduce intracellular signals that lead to inflammation, phagocytosis, or endocytosis. Studies show that CD36 is required for the uptake of myelin debris by phagocytic cells. In hepatocytes, CD36 was also shown to be transcriptionally regulated by AHR. However, studies showing the interaction between AHR signaling and CD36 expression in the CNS are limited. In this project, we explored this interplay, their potential role in remyelination, and subsequent neuroprotection against degenerative CNS diseases.

Clustered lung volume defects in diferent lung diseases utilizing hyperpolarized gas MR images

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Introduction

Hyperpolarized (HP) gas MR imaging (MRI) is a powerful tool that shows lung structure and lung function with regional specificity. Utilizing HP gas MRI, a novel 3D spherical defect-focused tool has been created to allow the quantification of clustered defect formations and comparing them throughout different lung diseases with corresponding ventilation defect percentages (VDP). In this study, the VDP and the percentages of clustered lung volumes (PCLV) were compared among asthma, COPD, and CF to gain further knowledge of the physiology of these lung diseases.

Methods

The HP gas MR images of 49 asthmatic, 16 CF, and 5 COPD patients were analyzed to identify regions of defective signal. For each defect voxel, the radius at which half of the voxels in a growing spherical contour were defect was calculated. The corresponding spherical volume normalized to the whole lung volume was stored as that voxel's PCLV. The final PCLV is the lung volume-corrected mean percentage from all spheres obtained for each patient. Analysis of covariance (ANCOVA) was performed to analyze possible differences in lung diseases.

Results

A scatter plot of VDP vs PCLV was created with an intercept at zero for all three lung diseases and linear regression slopes were obtained for asthma (m=0.036), COPD (m=0.083), and CF (m=0.073). ANCOVA confirmed statistically significant differences between PCLV and the different lung diseases (p=0.0001) which confirms that clustering is statistically different for each lung disease.

Conclusion

Defect clustering in lung volume is different among asthma, COPD, and CF for a given VDP.

Trends in outcomes from endovascular aortic repair over two decades

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Introduction

Endovascular therapy for aortic pathology has changed over the past two decades with newer stent technologies. We examine the outcomes of endovascular aortic repair in a subset of patients.

Methods

Patients undergoing endovascular aortic repair were identified at an academic institution (2003-2022). Descriptive statistics were used to report outcomes.

Results

Seven-hundred and twenty-six patients underwent endovascular aortic repair of which sixty-three were included for analysis. Mean age was 74 with 76% men and 24% women. Indication for operation was aneurysm/pseudoaneurysm in 55 (87%), aortic thrombus in five (8%), penetrating aortic ulcer in one (1.6%) and aortic trauma in one patient (1.6%). The type of surgery was endovascular aortic repair (EVAR) in 51 (81%), thoracic endovascular aortic repair (TEVAR) in six (9.5%), chimney endovascular aortic repair (ChEVAR) in two (3.2%), and fenestrated endovascular aortic repair (FEVAR) in four patients (6.3%). All patients were ASA class 3 or 4 with CAD in 38%, stroke in 13%, COPD in 33% and CKD in 11%. At thirty-days were there two deaths (3.2%) with two patients requiring reintervention (3.2%). At a mean follow-up of 32.6 months overall, there were 21 deaths (33%).

Conclusion

This dataset demonstrates that endovascular aortic repair is durable and associated with excellent outcomes across two decades of device use. A significant proportion of the patients died at a mean of 3 years following initial repair, unrelated to their aneurysm surgery, suggesting that patients with aneurysmal disease are prone to succumb to medical comorbidities at a high rate.

Improvement of c-peptide quantification with LC-MS/MS and MRM

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Introduction

C-peptide secretion mirrors beta-cell function, and has emerged as a valuable clinical biomarker of diabetes mellitus. C-peptide measurements can be used to provide estimates of insulin secretory capacity, to inform clinical decisions by distinguishing between types of diabetes. In order for C-peptide to be used in clinical settings, results must be traceable to a standardized reference material. Standardization ensures that varied assays of the same analyte performed regardless of location or time are comparable. Currently, c-peptide assays remain unstandardized. An ideal reference method is vital to the standardization process, capable of measuring the analyte with the utmost accuracy and specificity.

Methods/Results

Our lab initiated an international standardization program for C-peptide and developed a reference method for its quantification. However, the method must be more sensitive to quantify C-peptide in clinical situations where Beta-cell function is reduced. We improved upon this method by using protein depletion, reduction, alkylation, digestion, and tandem LC-MS/MS enhanced with a Multiple Reaction Monitoring (MRM) quantitation method. Anonymized leftover patient samples were used to compare the developed method against a clinical assay. The method was analytically validated by performing experiments to determine the Lower Limit of Quantitation (LLOQ), reproducibility (CV), linearity, and interferences.

Conclusion

In conclusion, we have developed a c-peptide quantitation method which can serve as a candidate reference method for c-peptide standardization.

What is the story behind the numbers? Surveilling perceptions of community members regarding COVID-19 vaccination and protocols in rural Missouri

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Introduction

To date, only 44.7% of the state of Missouri is fully vaccinated with a first booster dose against COVID-19. Despite intensified public health efforts, Missouri lags far behind the national average, leaving many Missourians at risk for hospitalization and death. We sought to investigate common perceptions that influence rural Missourians' decision to vaccinate.

Methods

Beginning in August 2021, trained community health workers administered 579 surveys via cross-sectional convenience sampling and conducted qualitative interviews with community members in several rural counties of Missouri. Informants discussed why they were or were not choosing to get vaccinated against COVID-19, who they trust to give them information about vaccinations, and their general viewpoints on vaccination. Responses from the paper surveys were manually entered into Qualtrics software for content analysis and we independently reviewed narratives to identify consistent themes.

Results

The analysis of unvaccinated respondents revealed several themes: 1) a general mistrust in "the system," with many informants citing vaccine efficacy and the wide array of contradictory and changing information in the media as primary concerns; 2) strong belief in the right to exercise personal autonomy; 3) trust in physicians for sources of credible information on vaccinations.

Conclusion

Continued surveillance of perceptions of COVID-19 vaccinations by qualitative metrics is critical for developing tailored, local vaccine administration/ outreach efforts and in understanding vaccine hesitancy in rural Missouri. Utilizing physicians and other healthcare professionals, emphasizing vaccine efficacy, and deploying accurate and consistent messaging could prove very effective in helping to improve vaccine uptake.

Medicaid expansion in Missouri: The rural provider perspective

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Introduction

In 2020, Missouri voters passed a constitutional amendment expanding Medicaid coverage. Estimates of the size of the expansion population range from 225,000 to 275,000, with a greater proportion of new enrollees likely to come from rural and other health care workforce shortage areas. While previous Medicaid research has primarily focused on enrollees, this study expands on a small body of emerging research on the health care providers available to care for Medicaid enrollees.

Methods

This study uses a mixed-methods approach. The first stage involved conducting key informant interviews with rural Missouri providers who saw at least 10 Medicaid patients during the previous year. Participants were recruited using the MO HealthNet Medicaid Provider and Clinic Files and snowball sampling. Structured interviews queried providers' readiness, perceptions, and responses to Medicaid expansion. The second stage will use interview results to conduct an online survey with a larger sample of Missouri health care providers during early 2023.

Results

Preliminary findings suggest that health care providers in rural Missouri worry about their capacity to care for new Medicaid enrollees, experience challenges with Medicaid billing and reimbursement, and are unlikely to have received formal training on Expansion or Medicaid in general.

Conclusion

This study examines providers' experiences with the changing landscape of rural health care capacity and need following Medicaid expansion. Results will be used to inform policy makers, providers, and other stakeholders via a summary report, peer-reviewed publication, and data dashboard.

Return to physical activity following Vertebral Body Tethering

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Introduction

Vertebral Body Tethering (VBT) is a new surgical treatment for severe adolescent idiopathic scoliosis that is hypothesized to maintain postoperative spinal flexibility. To date, limited data exists on a patient's ability to return to preoperative physical activities postoperatively and whether the intensity of those activities are associated with an increased risk for tether breakage. We aimed to determine if postoperative physical activity changed following VBT and if high intensity activities resulted in a greater incidence of suspected broken tethers.

Methods

We assessed clinical and radiographic data from 63 patients. The skeletal impact of patients' activities were classified using two metrics: Metabolic Equivalent of Task (MET), and Relative Intensity Level (RIL). These data were further assessed based on their relationship to the index procedure or a suspected broken tether (e.g., pre-break or post-break). We performed either a Two-Sided T-Test or a Chi-Square Test with statistical significance set at an alpha (α) of ≤0.05.

Results

We observed no difference between baseline and postoperative MET or RIL ($p=0.9133$, $p=0.816$). A total of 28 patients (44%) exhibited a broken tether. The likelihood that a patient would exhibit a broken tether was not influenced by higher postoperative activity intensity (MET: $p=0.409$; RIL: $p=0.952$).

Conclusion

A VBT procedure does not significantly influence a patient's ability to return to their preoperative physical activities. Moreover, postoperative activity intensity does not impact the likelihood of exhibiting a broken tether. These findings suggest that patients can comfortably return to high intensity sports postoperatively.

Establishing a rat surgical model of recurrent laryngeal nerve repair for targeted treatment discovery

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Introduction

The recurrent laryngeal nerve (RLN) is vulnerable to iatrogenic injury during anterior neck surgeries, particularly thyroidectomy. Although the injured RLN can regenerate, return of normal laryngeal function is rare and results in persistent dyspnea, dysphonia, and dysphagia that negatively impact health and quality of life.

Objective

We sought to optimize our rat surgical model of RLN transection with nerve grafting repair to complement our novel intraoperative vagal nerve stimulation (iVNS) treatment strategy, with the goal of restoring normal laryngeal function.

Methods

We compared 3 microsurgical repair approaches for RLN transection in adult Wistar or Sprague Dawley rats of either sex: 1) silastic conduit repair with 1 mm nerve gap and hydrogel polymer, 2) direct anastomosis, and 3) Gelfoam as a nerve coupling agent. These ventral neck techniques were first implemented in cadaveric specimens and subsequently terminal surgeries for procedural refinement. The outcomes led to a survival surgery pilot study in 10 rats which entailed right RLN transection and repair using silastic conduit and hydrogel, intraoperative treatment via iVNS or sham (no stimulation) for 30 minutes, and endoscopic laryngeal assessment of breathing and the laryngeal adductor reflex (LAR) over a 12-week period.

Results

Initial post-operative endoscopy showed ipsilateral laryngeal paralysis affecting breathing and the LAR. Recovery over 12 weeks was variable within and between treatment groups.

Discussion

Further refinement of our surgical protocol is underway to reduce outcome variability. We will continue to explore iVNS as a translational treatment option for accelerated and improved functional recovery following iatrogenic RLN injury.

Cutaneous squamous cell carcinoma metastasis to parotid, analysis of outcomes with positive margins at initial resection

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Introduction

Patients with metastasis of cutaneous squamous cell carcinoma (SCCa) to intraparotid lymph nodes are often treated with parotidectomy and neck dissection. Pathology reports may comment on the presence of carcinoma at the inked edge of a specimen, but the clinical significance of this "positive margin" is understudied.

Objective

Investigate clinical outcomes in patients undergoing parotidetomy and neck dissection for cutaneous SCCa with regard to pathologically-noted positive specimen margins.

Methods

Retrospective cohort study. Patients undergoing parotidectomy and neck dissection for metastatic cutaneous SCCa were reviewed. Patients were categorized as having positive or negative specimen margins based on pathology reports. Treatment plans and survival outcomes were analyzed.

Results

23 patients met inclusion and exclusion criteria. Patients had an average follow- up of 15 months. Most patients (16/23, 70%) received adjuvant radiation after surgery. Nine patients had pathologic evidence of carcinoma at specimen edge, and 14 did not. Four of nine patients with positive margin (44%) had disease recurrence over the study period, compared to recurrence in only two of 14 patients without a positive pathologic margin (14%).

Conclusion

Pathologically positive nodal margins in patients undergoing parotidectomy and neck dissection for metastatic cutaneous SCCa may indicate aggressive disease with higher likelihood of recurrence. Future studies including more patients from multiple institutions, and especially prospectively-collected data, may better define patients at risk of recurrence.

The management of psychiatric conditions in patients with Parkinson's Disease

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Introduction

Parkinson's Disease (PD) is a common neurodegenerative disease induced by a progressive deterioration of dopaminergic neurons in the substantia nigra. PD is classically characterized by a motor triad of bradykinesia, rigidity, and resting tremor, though nonmotor neuropsychiatric symptoms can also be seen in association with PD. Depression, anxiety, psychosis, and sleep disorders are often comorbid with PD, yet management of these psychiatric disorders is poorly understood. The underreporting of these comorbid psychiatric conditions in PD may contribute to the lack of concrete management guidelines.

Methods

In this paper, we performed a comprehensive search in the PubMed database to review the current literature on managing psychiatric disorders in PD patients. The inclusion criteria consisted of the keywords "Parkinson's Disease," "psychiatric," and "treatment or management" combined using "and" to search for clinical trials, meta-analyses, randomized controlled trials, reviews, and systematic reviews published since 2010. We included all languages, ages, and sexes and excluded books, commentaries, and letters to the editor. 1,607 articles were found on PubMed and analyzed.

Results

Interventions such as SSRI drugs and CBT therapy may be beneficial for managing certain psychiatric conditions, though there is not enough clinical evidence to fully establish standardized treatment guidelines.

Conclusion

To improve the quality of life in individuals with PD, further research should be conducted to improve the assessment of psychiatric comorbidities and increase knowledge on which pharmacological and nonpharmacological treatment options are the most effective.

Western diet induces the activation of mineralocorticoid receptors and promotes skeletal muscle lipid disorders and insulin resistance

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Introduction

The consumption of a Western Diet (WD) activates mineralocorticoid receptors (MRs) and promote insulin resistance. An excessive circulation of lipids increases total intramyocellular (IMC) lipid content and ectopic fat storage causing lipotoxicity and insulin resistance in skeletal muscle. However, there are gaps in our understanding the precise mechanisms by which enhanced MR activation promotes skeletal muscle insulin resistance.

Methods

Six-week-old C57BL/6J female mice were fed either a chow-diet or a WD with or without Spironolactone (img/kg/day) for 16 weeks. Fasting glucose and intraperitoneal glucose tolerance tests (IPGTT) test was done to determine systemic insulin resistance. In vitro and ex vivo skeletal muscle insulin resistance were determined by western blot, immunostaining, and real time PCR.

Results

Spironolactone attenuated 16 weeks of WD-induced in vivo glucose intolerance and insulin resistance, and improved soleus insulin metabolic signaling. Improved insulin sensitivity was accompanied by increased Glut-4 expression in conjunction with decreased soleus free fatty acid and IMC lipid content, as well as CD36 expression. Additionally, spironolactone prevented WD-induced soleus mitochondria dysfunction. Furthermore, MR signaling also mediated WD/aldosterone-induced reduction in soleus microRNA (miR)-99a, which was identified to negatively target CD36 and prevented palmitic acid-induced increases in CD36 expression, lipid droplet formation, mitochondria dysfunction, and insulin resistance in C2C12 cells.

Conclusion

abnormal expression of miR-99a, which had the capacity to reduce CD36, leading to reduced IMC lipid content, improved soleus mitochondria function and insulin sensitivity.

Female representation in the field of plastic and reconstructive surgery

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Introduction

The field of plastic and reconstructive surgery has historically been comprised of more males than females. Recently, there has a been a shift toward increasing diversity within residency programs in terms of sex with the goal of alleviating disparities that exist in today's physician workforce.

Methods

Association of American Medical Colleges' (AAMC) resources were utilized to obtain demographic information on active plastic surgeons and residency applicants. Current integrated plastic surgery residency programs were determined via the American Council for Graduate Medical Education (ACGME).

Results

The AAMC 2007 Physician Data Report stated 794 practicing plastic surgeons were female, comprising 11.9% (n = 6,671). Then in 2019, 17.2% (n = 7,317) were female. Comparing applicants, the distribution of male to female applicants is changing, as seen in 2016 when 229 more males applied compared to 2021, where only 19 more males applied than females. The current resident make-up is comprised of 510 male residents (52.7%, n = 968) and 458 female residents (47.3%, n = 968), demonstrating there are only 52 more males than females overall.

Conclusion

Looking at demographic information of applicants and current residents, we saw an increasing number of females during recent years. The shift in the demographics of residents will allow for the disparities in the numbers of males compared to females within the field to decline. With the recent changes favoring more female residents, it allows us to remain optimistic that programs, and in turn the field of plastic and reconstructive surgery, will increase in diversity in the coming years.

Experience with multisystem inflammatory syndrome in children (MIS-C) at University of Missouri Healthcare

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Introduction

Multisystem Inflammatory Syndrome in Children (MIS-C), while rare, can arise as a complication from COVID-19. The Centers for Disease Control and Prevention (CDC) defined the following criteria for MIS-C: age <21 years, clinical presentation of fever, laboratory evidence of inflammation, multisystem involvement (>2), severe illness requiring hospitalization, recent or current SARS-CoV-2 infection, along with no alternative plausible diagnoses.

Methods

A review was conducted of 26 cases of patients admitted to MUHC between October 2020 and February 2022 meeting the CDC criteria.

Results

Of the 26 cases, there were equal numbers of male and female patients, with a mean age of 9.3 years. At time of presentation, the most common symptom was abdominal pain, reported in 15/26 patients. The longest hospital admission was 20 days with 12 of the patients requiring ICU admission. Common lab abnormalities included elevated troponin, D-Dimer, Pro-BNP, and Fibrinogen. Regarding cardiac involvement, the most common finding on EKG was T-wave abnormalities, as seen in 8/26 patients. Patients noted to have cardiac involvement were continued on aspirin. For treatment, immunoglobulins were the most utilized, with 24/26 patients revieing the treatment, followed by steroids, with 19/26 patients receiving the treatment. Majority of patients had no long-term complications and there were no deaths among those admitted.

Conclusion

The cases seen at MUHC are similar to those seen at the national level. While there is still more to learn about the pathogenesis of MIS-C, comparing patient cases from various healthcare settings can provide insight on how to best care for those with MIS-C.

A propensity score matched analysis of peri-operative outcomes in elderly patients undergoing different types of urinary diversion following radical cystectomy using the NSQIP dataset

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Introduction

Choosing urinary diversion after radical cystectomy (RC) is complex. Continent diversions are generally not offered to elderly patients. The objective of this study was to assess peri-operative outcomes in patients age 70 or greater compared to younger patients after RC with Continent Urinary Diversion (RCCD).

Methods

We queried the National Surgical Quality Improvement Program (NSQIP) participant use files from 2009 to 2015 using CPT code (51596) for RCCD. Patients younger than 70 years old were compared to patients 70 and older. Characteristics such as Age, BMI, and ASA were used to obtain propensity score matching. Outcomes compared; length of hospital stay (LOS), rate of reoperation, mortality, rates of complications.

Results

1,161 patients met criteria. After propensity matching, 463 patients remained. Patients age 70 or older (n=253) were found to have significantly increased mean LOS (11d v. 9d; p=0.041). Patients older than 70 had significantly higher mortality within 30 days (3.9% v. 0.4%; p=0.014) and unplanned intubation (5.1% v. 1.4%; p=0.039). No significant differences were found in rates of re-operation (p=0.321) acute renal failure (p=0.134), renal insufficiency (p=0.057), bleeding requiring transfusion (p=0.773), cardiac arrest (p=0.130), MI (p=1.000), DVT, pneumonia (p=0.429), surgical site infection (SSI) (p=0.449), PE (p=1.000), sepsis (p=0.767), septic shock (p=0.342), UTI (p=0.775), wound disruption (p=1.000), prolonged ventilator dependence > 48 hours (p=0.359), or deep SSI (p=0.392).

Conclusion

Patients over 70 years of age undergoing RC-CD have similar complications when compared to patients younger than 70. The older age group experienced significantly increased LOS, higher mortality and unplanned intubation.

Developing a data quality framework for Immunization Information Systems (IIS): The case of Missouri *ShowMeVax*

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Introduction

An effective immunization information system (IIS) is crucial in maintaining a responsive public health system which depends on the quality of vaccination data administered through a state's health systems1. In collaboration with the Missouri Department of Health and Senior Services (DHSS), the study extracted the whole IIS data, investigated data problems, and developed an IIS data quality framework to improve the Missouri IIS named as *ShowMeVax*.

Methods

The research employed a mixed-methods approach for the study including data collection through survey methods, onsite focus group discussion (FGD), 14 iterative bi-weekly research group discussions with DHSS, content analysis, process tracing, and literature review including statistical analysis using SQL and python algorithms.

Results

ShowMeVax contains 908 tables, 11226 columns, and a total of over 803 million observations augmented by a 957-page data dictionary. After an in-depth investigation of the data, the study identified major data problems in the Missouri IIS including (a) data duplication, (b) missing observations, (c) unstructured and complex data systems for many tables, including HL7 protocol data, (d) illogical and implausible data entry, data definition and mapping for race categorization and naming of jurisdictions, etc. Based on these data problems, the study developed a data quality framework for *ShowMeVax*.

The framework includes an IIS data model that identifies nine different data domains for data characterization and quality checks. The domains are: Provider, Clinic, User, HL7 User, Patient, Immunization, HL7 Activity, HL7 Acknowledgement, and HL7 Error Codes. All these data domains are designed to undergo some defined data quality checks. The study identified 10 components of data quality checks. They are (1) data duplication, (2) missing observations, (3) patients with records of receiving the same vaccines multiple times, (4) vaccination administration date matching, (5) vaccination administration mapping by race, (6) race and ethnicity mapping elements, (7) reporting of vaccination coverage by county, (8) vaccination data elements with blank values and percentages for recipient state, zip code, VTrckS PIN, (9) Illogical dates and values: future or past dates for patient's birth records and vaccination administration, and (10) time elapsed for immunization and birth record reporting. However, these data quality checks are identified based on the IIS data quality metrics as developed in Table 1, which is a major component of the proposed IIS data model.

Conclusion

The proposed data model would help eliminate various data issues for ShowMeVax and would improve the Missouri IIS in producing robust vaccination data and reports, which would eventually significantly increase immunization coverage and sensitivity in the state of Missouri.

Sleep restriction and altered sleep timing on physical activity

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Introduction

Sleep schedule desynchrony and total sleep time reduction can lead to changes in physical activity (PA). However, few studies have assessed whether the timing of sleep restriction impacts PA patterns. Thus, we aimed to measure energy expenditure following an early wake and late sleep period.

Methods

Fourteen participants (mean age = 27 y) who met the inclusion criteria (sleep 7-9 h per night and have a BMI of <40 kg/m^2) participated in three randomized crossover conditions: normal sleep (7-9h), early wake (2-h advanced wake-time), and late sleep (2h delayed bed-time) for 4 nights. Average daily steps were calculated in all groups for the following day for each of the 4 nights. PA was defined as step count and percentage of time spent in sedentary, light, and moderate-to-vigorous PA (MVPA) which was measured via a hip accelerometer (ActiGraph).

Results

Average daily steps were higher in early wake group when compared to normal sleep (7471 ± 3019 vs. 5840 ± 2204 steps/day, p = 0.02) but not late sleep (6198 ± 2309 steps/day, p = 0.8). Activity analysis of PA in the 2 hours before bed (late sleep) and upon the first 2 hours of waking up (early wake) showed no difference between the two sleep conditions. Furthermore, no differences were detected between time spent in sedentary, light, or MVPA across all study groups.

Conclusion

Our findings suggest that the timing of sleep restriction (early vs late) can influence PA the following day, such that waking up early specifically could potentially increase total daily PA.

Examining the effect of the COVID-19 pandemic on university students' life and their use of substances: A pilot study

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Background/Purpose

This study was to explore the challenges among students during the pandemic, particularly in the areas of substance use.

Methods

In order to achieve the goal, the current study utilizes a cross-sectional online survey to collect information regarding student challenges experienced during the pandemic, different types of substances (tobacco, alcohol, opioids, and marijuana), and their physical health (exercise), mental health (anxiety and depression), and emotional well-being (life satisfaction and COVID-19 phobia). To date, a sample of 70 University of Missouri students responded to our survey. Descriptive analyses were performed using R 3.6.1.

Results

Compared to the pre-pandemic, alcohol was the most used substance, with more than half, increased their use. More than one fourth of marijuana users, 15% of opioid users, 10% of combustible tobacco users, and 9% of non-combustible tobacco users increased their use of each substance during the pandemic. Both combustible and noncombustible tobacco users were significantly associated with a decrease in life satisfaction. Combustible tobacco use was also significantly associated with an increase in COVID-19 phobia. In terms of the challenges, loss of job/scholarship was significantly associated with opioid use and non-combusted tobacco use. All the other associations were not significant.

Conclusion

Our study shows that an increase in the use of different types of substances during the pandemic is occurring. Both now and in the past-pandemic context, it is critical to meet students' needs to show our commitment to supporting them by helping develop alternative coping mechanisms to address their challenges and stressors.

Utilization of next-generation sequencing (NGS) in acute myeloid leukemia (AML): Case study

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Introduction

NGS plays a vital role in assessment in AML. Although most *RUNX1* mutations in AML are acquired, they can also be germline. Distinction of somatic vs. germline mutations is important for classification and monitoring in other family members.

Methods

We present a case of AML with *RUNX1* and accompanying *BRCA2* germline mutation.

Results/Clinical History

A 76-year-old male presented with nosebleed and back pain with a WBC count 90 x10(9)/L, hemoglobin 9.2 g/dL, and platelets of 28 x10(9)/L. Bone marrow showed 42% blasts and flow cytometry showed bright CD34, CD117, and CD13, moderate CD33, and HLA-DR consistent with AML. NGS detected pathogenic alterations in *BRCA2* (VAF- 42.12%) and *RUNX1* (VAF-48.41%), and various other genetic alterations.

Conclusions

NGS provides information about clinically significant alterations, potential targeted therapies, and available clinical trials. NGS is an important tool in detecting potential germline pathogenic mutations. The *BRCA2* tumor suppressor gene is associated with breast, ovarian, prostatic and pancreatic carcinoma. *RUNX1* functions as a tumor suppressor and somatic mutations in AML are common. Based on the allele frequency of *BRCA2* and *RUNX1*, the mutations here may be germline. This raises issues of proper classification as AML with germline *RUNX1* vs AML with mutated *RUNX1*. A substantial proportion of patients with AML harbor unsuspected germline mutations in DNA damage response genes such as *BRCA1/2*. Confirmation with germline testing has important implications in the management of leukemia, as well as genetic counseling of family members and cancer screening.

Identifying physician preferences for faculty development at a regional medical campus

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Introduction

With demanding schedules and increasing workloads, it can be difficult for physicians to set aside an entire half or full day dedicated towards in-person faculty development workshops. This is especially true in rural areas, where physicians are spread out and must travel to a central location. Thus, a need to provide more efficient training has been identified. This study was created to gauge the interest of delivering faculty development content via social media platforms, such as Twitter, Facebook and LinkedIn, as many healthcare workers use these to share professional development resources.

Methods

With IRB approval, an eight-question online survey was emailed to 362 MU Springfield Clinical Campus physicians. All questions were multiple choice, and responses were received and analyzed via Qualtrics.

Results

Responses were received from 101 (27.9%) physicians. They indicated they prefer 10-to-30-minute videos and articles posted monthly on an open access website or sent in an email. Topics they would like covered include evaluating student performance, practice-based teaching strategies, working students into practice, and expectations of the medical school.

Conclusion

The majority of physicians who responded indicated they would not prefer using social media platforms for faculty development. However, a succinct method of content delivery is still preferred. Taken together, this information will help inform future decisions for creating high yield, time efficient content that's more readily accessible to physicians.

Subcellular localization of TRPV4

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Introduction

TRPV4 is a cation channel expressed in cardiomyocytes. Its expression is increased with advancing age or cardiovascular disease. Its cellular role has not been fully elucidated. Currently, there is no data on TRPV4 sub-cellular localization. The goal of this investigation was to localize TRPV4 within atrial and ventricular cardiomyocytes and determine if TRPV4 localization changes in response to the physiological effector, angiotensin II.

Methods

Cardiomyocyte Isolation: Mouse cardiomyocytes were enzymatically isolated from aged hearts. Cells were treated with either 0 Ca^{2+} PSS or 100 nm Angiotensin II for 20 minutes. Cells were incubated with an anti-TRPV4 primary antibodies followed by an Alexafluor 633 nm secondary antibody.

Cardiomyocyte Imaging: Atrial and ventricular cardiomyocytes were imaged using a Leica SP8 confocal microscope. Images were exported and analyzed using Image J software.

Image Analysis: A blinded observer evaluated subcellular localization of TRPV4. Unpaired T-tests were performed to assess differences between atrial and ventricular cells.

Results

Consistent central perinuclear TRPV4 staining was observed in all groups (53/53 cells). All ventricular cells showed a striated pattern, whereas only half of the atrial cells showed a striated pattern ($p < 0.0001$).

Conclusion

Consistent with previous studies, TRPV4 expression was observed in both perinuclear areas and along the t-tubule network in ventricular cells. In contrast, in atrial cells TRPV4 was variably localized to ttubules. This finding suggests the role of TRPV4 is more heavily tied to a location along T-Tubules in ventricular cells compared to atrial cells.

Cannabinoid-induced Stevens-Johnson syndrome

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Introduction

Stevens-Johnson syndrome (SJS) is a hypersensitivity skin reaction caused by medication usage that can occur alongside systemic symptoms. We are presenting a case of cannabinoid-induced SJS in a 32-year-old female who presented with a worsening rash. Diagnosis was established following skin biopsy and detailed historytaking of medication and other drug usage. There currently exists limited literature describing SJS due to recreational drug usage.

Case Presentation

A 32-year-old female presented with a three-day-history of a vesicular and maculopapular rash. The rash worsened despite treatment with diphenhydramine, hydrocortisone, and doxycycline. Medication review demonstrated no new changes, and infectious workup for numerous bacteria, viruses, and tick-borne illnesses came back negative. Laboratory results demonstrated elevated CRP, leukopenia, and transaminitis. Skin biopsies demonstrated dermatitis with exocytosis of mononuclear cells into the epidermis and vacuolar changes noted at the dermal-epidermal junction, confirming the diagnosis of SJS. Further history-taking revealed usage of a new strain of cannabis the day prior to symptom onset. After consulting acute care surgery, ophthalmology, and skin care team, supportive management involving acetaminophen, hydromorphone, diphenhydramine, and topical triamcinolone ultimately led to resolution of the rash.

Discussion and Conclusion

Here, we have described a novel case of SJS caused by cannabinoid usage. This case demonstrates that a detailed history is necessary to delineate exposures in the setting of SJS and recreational drug usage is unregulated by the FDA and thus poses unknown risk of hypersensitivity reactions. Rapid identification of causative agents with SJS is critical for discontinuation and avoidance to maximize clinical outcomes.

Scoping review of post-implantation syndrome following endovascular repair for abdominal aortic aneurysm

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Objective

Post-implantation syndrome (PIS) following AAA repair is associated with a low-grade inflammatory response, but outcomes and risk factors are poorly described. We report the findings of a scoping review of published literature on PIS.

Methods

381 records were identified using PRISMA guidelines from five major databases and were screened for inclusion, yielding 31 studies. Chi-square and T-test analyses were used to evaluate risk factors, characteristics, and outcomes.

Results

A total of 2847 patients undergoing elective procedures were included, with mean age 71 and male gender in 90.4%. Mean pooled aneurysm diameter was 56.4 mm and 72.2% were polyester grafts. Overall, 25% of the cohort developed PIS and mean hospital stay was 6.3 days. At 30-days pooled mean of 0.25% died and 1.7% suffered type II endoleak. Univariate analysis demonstrated PIS was associated with graft material (95% polyester vs. 68.5% PTFE; p=0.0001), higher preoperative (7.61 vs. 6.76; p=0.04) and postoperative (15 vs. 9.8; p=0.0007) white blood cell count (WBC) and higher postoperative IL-6 levels (98.7 vs. 25.2 pg/mL; p=0.02). When examining type of graft used, polyester grafts were associated with higher average post-operative body temperature (38 vs. 37.5°C; p=0.005). PIS was not associated with endoleak, however, was associated with 30-day mortality (0.6% vs 0%, p=0.03) as well as major adverse cardiac events (5.8% vs. 0.43%; p<0.0001).

Conclusion

This review suggests that polyester rather than PTFE grafts are more commonly associated with PIS. The long-term effects of PIS are unknown but associated with MACE and 30-day mortality. Finally, a robust definition for PIS is lacking; we propose that PIS be diagnosed in patients with fever > 38°C within the first 24 hours after EVAR, associated with a WBC > 12,000 without overt signs of infection.

OPT imaging of precancerous cervical lesions

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Introduction

Optical polarization tractography (OPT) is a recently developed imaging modality that uses Jones matrix calculations to image tissue samples and provide information about the fiber orientation. In this study, we explored the feasibility of using OPT to image cervical tissue and distinguish between normal tissue and precancerous lesions.

Methods

Ectocervical samples were first imaged using OPT and then submitted for histological analysis.

Results

The three 3D images obtained show significant differences between histologically normal tissue and samples with cervical dysplasia. OPT imaging was able to capture the disrupted collagen fiber orientation in the stromal layer of the ectocervix that is characteristic of precancerous lesions.

Conclusion

These results demonstrate OPT's capability for detecting changes in fiber orientation present in cervical dysplasia. If we continue to apply OPT imaging to the differentiation of precancerous cervical lesions, it could prove a useful tool to improve cervical cancer screening.

Progesterone signaling in the oviductal epithelial cells regulates the inflammatory response during preimplantation embryo development

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Introduction

Ten to twenty percent of pregnancies end in miscarriage with eighty percent of pregnancy loss occurring during the first trimester. Because we lack a complete understanding of the environment within the oviduct (Fallopian tube in humans), it is difficult to provide diagnostic tools for oviductal origin of early pregnancy loss. Progesterone (P4) is required during the first day of pregnancy for normal embryo development and transport to the uterus. Increased cytokine levels during pregnancy have been associated with recurrent miscarriage.

Methods

The classical progesterone receptor (PGR) was conditionally ablated from the oviduct epithelium (epithelial *Pgr*$^{d/d}$). Preimplantation embryos were collected at 3.5 days postcoitus (dpc) to assess development and transport. Single-cell RNA-sequencing (scRNAseq) was performed on control and epithelial *Pgr*$^{d/d}$ oviducts at 0.5 dpc.

Results

Approximately 50% of embryos were nonviable or developmentally delayed and ~60% were retained in epithelial *Pgr*$^{d/d}$ oviducts at 3.5 dpc. scRNA-seq analysis of epithelial *Pgr*$^{d/d}$ oviducts showed an upregulation of inflammatory responsive genes (i.e., *Il22*, *Stat3* and *Tlr4*) in epithelial cell populations compared to control oviducts at 0.5 dpc.

Conclusion

These data suggest that epithelial PGR expression in the oviduct is crucial for normal embryo development and transport. Transcriptomic alterations due to a loss of oviductal epithelial PGR may lead to an environment not suitable for preimplantation embryo development and transport. These findings shed light on the roles of classical P4 signaling through epithelial PGR in the oviduct and offer potential applications for women's reproductive health and diagnostic tools of early pregnancy loss.

Unplanned readmission following same day oral cavity oncologic surgery

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Introduction

The standard of care for small oral cavity cancers is complete oncologic resection, which often is achieved via same-day surgery. However, patients discharged after same-day oral cavity resection may be at risk of readmission as head and neck cancer patients are often elderly and medically complex. Furthermore, as part of the Affordable Care Act, the Hospital Readmissions Reduction program aims to improve care and reduce avoidable readmission by linking payment to quality of care. Consequently, readmission rates are of interest as hospitals not meeting certain national standards will receive reduced payments from the Centers for Medicare and Medicaid Services.

Methods

Clinical data were reviewed for patients who underwent same-day oral cavity cancer surgery. The primary outcome was unplanned readmission within 30 days of discharge. Patient and disease factors associated with unplanned readmission were evaluated.

Results

In total, 41 patients underwent same-day surgery for oral cavity cancer. Thirteen had unplanned readmission (31.7%). Only one patient factor assessed was associated with unplanned readmission; distance of the patient's residence from hospital, quantified as driving time, was linked to readmission. Patients who were readmitted lived significantly closer to the hospital (35 minutes) compared to those without readmission (75 minutes). Groups were otherwise similar in their demographics, cancer location, and extent of surgery.

Conclusion

Patients are at significant risk of readmission after same day oral cavity cancer resection. Patients residing closer to the hospital where surgery was performed were more likely to have readmission in this study. Easy access to return for readmission or lower threshold to discharge closer patients may explain this finding.

Investigating learning management systems: Utilization of canvas in the clinical curriculum

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Introduction

Learning management systems (LMSs, e.g. Canvas) are used within undergraduate and preclinical curriculums to present course material in a centralized location. Canvas is utilized by some departments at MU to facilitate clinical curriculums, but student perception of this system has not been analyzed.

Methods

Two surveys were developed to collect data regarding the utilization of Canvas within the clinical curriculum. The first survey was provided to students at the beginning of their Neurology clerkship. The second survey was provided at the end of their Neurology clerkship. A one-sided, unpaired t-test was performed to compare the data.

Results

Students endorsed that Canvas was utilized to some degree in 89% of their non- Neurology clerkships. Students felt their non-Neurology clerkships were personalized 56% of the time, compared to 82% of the time in their Neurology clerkship ($p = 0.023$). Students felt their non-Neurology clerkships were organized 88% of the time, compared to 100% of the time in their Neurology clerkship ($p = 0.047$). 100% of students suggested Canvas be utilized in future Neurology clerkships.

Conclusion

Our data suggest that students feel that personalization and organization within the Neurology clerkship, which fully utilizes Canvas, was significantly higher than within other clerkships, which may not fully utilize Canvas. Students overwhelmingly agree that Canvas should continue to be utilized within the Neurology clerkship. Further data will help establish the utility of LMSs and allow for the optimization of the clerkship experience throughout the School of Medicine.

Prevalence of neck and arm pain at a tertiary academic center: Comparison between surgical and non-surgical physicians

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Introduction

Neck and arm pain are common musculoskeletal disorders that have been examined extensively in surgical physicians. However, there is limited knowledge of prevalence in non-surgeons or comparison studies among surgeons and non-surgeons. We aim to compare and understand the prevalence of neck and arm pain in these populations.

Methods

A questionnaire was sent electronically to all physicians within a hospital system. Collected data included demographics, procedural/surgical environments, incidence of neck/arm pain, imaging and treatment received, formal ergonomic training received, and rate of environmental/postural modification made secondary to symptoms.

Results

20.6% of surgeons and 18.5% of non-surgeons within the hospital system responded to the survey. 59.3% (n= 32) of surgeons and 48.3% (n= 57) of non-surgeons reported one or more of the following: arm or hand paresthesia, pain necessitating treatment, or acute-onset upper extremity weakness or pain while operating or performing procedures. Residents and fellows in surgical specialties were more likely to report symptoms than non-surgical residents and fellows ($p= 0.044$, $p < 0.05$). Surgeons who reported being several inches shorter than their co-surgeons were more likely to report symptoms ($p= 0.05$) while there were no associations with shorter height and symptoms in non-surgeons ($p= 0.638$). Only 7.8% of surgeons and 6.8% of nonsurgeons received formal ergonomic training.

Conclusion

This study suggests a high prevalence of upper extremity pain among surgeons and non-surgeon survey respondents. Surgeons and non-surgeons reported low rates of ergonomic training which demonstrates the need for further education to prevent or improve pain, prolong career longevity, and increase work satisfaction.

Understanding the effects of interventions for parent/caregiver alcohol use on children

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Introduction

Children of parents with alcohol use disorders (AUDs) face increased risk for a wide variety of negative outcomes. Effective interventions have been developed to prevent and treat AUDs and associated problems, but little is known about whether and how much such interventions reduce risk for the children of parents who receive them. A scoping review was conducted to identify and characterize the available published research literature that has examined this question.

Methods

The PubMed (MEDLINE) database was searched on March 21st, 2022 for randomized controlled trials with an appropriate control condition that reported at least one outcome from a sample of children (under 18 years) whose parent(s) or primary caregiver(s) received an intervention intended to reduce or prevent alcohol use and/or an alcoholrelated behavioral health (BH) concern. All articles will be screened by two team members with discrepancies resolved by consensus. Study characteristics will be coded including features of the interventions, comparison conditions, samples, moderators, mediators, and outcomes examined, and study findings regarding intervention effects on child outcomes.

Results

The PubMed search returned 537 total records. Forty-two potentially eligible studies have been identified through title and abstract screening. Full text screening and data extraction are currently underway.

Conclusion

We expect that the majority of identified trials will report significantly better outcomes for children of parents who received alcohol-related BH interventions vs. children of parents in control conditions. However, we also expect to find significant deficiencies in the quantity and/or quality of the relevant research literature.

Life story books as a reminiscence therapy tool for dementia: An updated review from 2018-2022

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Introduction

The global burden of dementia is expected to rise to 74.7 million in 2030 (1). There has been increasing evidence that reminiscence therapy improves cognition and depressive symptoms in individuals with dementia. Digital life story books (LSB), which gather autobiographical memories into video books, have emerged as an increasingly popular tool of RT (2). However, there has been limited research into the preferences of dementia patients, the efficacy of LSBs, or the optimal way to implement them.

Methods

Using four electronic databases, we completed a systematic literature search for studies describing the effectiveness of LSBs and patient and caregiver preferences regarding their use. Only studies dating from 2018-2022 were included.

Results

Digital LSBs improved neuropsychiatric symptoms in dementia patients, as well as improved the quality of life of caregivers (3). Caregivers with advanced computer skills preferred to create LSBs (64.7%), while those with elementary/intermediate skills opted to have LSBs created for them (35.3%) (4). Studies performed in long-term care communities revealed that staff who watched LSBs of their patients demonstrated greater levels of empathy and lower workload burden. Dementia patients preferred that LSB be tailored to their own individual needs and experiences, but in practice, many settings used templates created by staff or by caregivers.

Conclusion

Evidence suggests that digital LSBs have the potential to significantly improve the quality of dementia care. Further research into the efficacy of digital LSBs can help personalize and optimize the usability and impact of this tool elevant research literature.

Variance in approach outcomes for hemiarthroplasty in femoral neck fractures

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Introduction

Femoral neck fractures are common injuries with potentially devasting sequalae if left untreated. Hemiarthroplasty is frequently utilized to treat displaced femoral neck fractures in the elderly. The purpose of this study is to investigate postoperative outcomes between anterior, lateral, and posterior surgical approaches in hemiarthroplasty for femoral neck fractures.

Methods

Nine hundred thirty-nine femoral neck fractures were treated with hemiarthroplasty from 2010-2021 at multiple institutions. The mean follow-up was 20 months (15-25 months). Analyses were performed to examine differences in outcomes based on surgical approach, including intraoperative data points, postoperative complications, and functional outcomes.

Results

Of the 939 femoral neck fractures treated with hemiarthroplasty, 70 (7.5%) were performed by direct anterior approach (DAA), 250 (26.6%) by direct lateral approach (DLA), and 619 (65.9%) were posterior approach (PA). Statistically significant differences in operative time were noted between DAA and DL approaches (84 vs. 105). Fewer patients in the DAA group (2, 1%) required ICU stay compared to DLA (37, 26%) and PA (105, 17%) (P=.0078). The mean length of stay was significantly lower for DAA (5.2 days), compared to DLA (7.2 days), and PA (7.5 days).

Conclusion

In our multicenter retrospective cohort, DAA was found to have decreased operative times, decreased length of stay, and a higher likelihood of ambulation prior to discharge compared to other approaches. DAA patients demonstrated lower mortality at two years postoperatively. These differences may lessen the morbidity and mortality associated with femoral neck fractures treated with hemiarthroplasty.

Residency match results for a regional medical campus in Missouri

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Introduction

As a response to physician shortages, many medical schools in North America have begun to utilize regional medical campuses (RMCs) for clerkship training. The University of Missouri- Columbia established an RMC in Springfield, with the first class graduating in 2018. Some studies have investigated the correlation between RMC training and the proportion of trainees choosing to enter primary care specialties. However, few have investigated RMC match results for the full spectrum of medical specialties. We aim with this preliminary study to assess Match trends among graduates of the Springfield Clinical Campus (SCC) over a several year timespan.

Methods

Using publicly available data, the gross number of students who matched in each specialty from 2018 to 2022 was calculated. Only students that attended the SCC and previously consented for their match data to be public were included in the dataset.

Results

Match results from 67 students at the SCC were available. 10 students matriculated to emergency medicine programs, the highest of any specialty. Internal medicine and family medicine also attracted a large percentage of students, each attracting 8 graduates. Graduates matched into a broad range of specialties, including dermatology, radiation oncology, OBGYN, general surgery, pediatrics, neurology, and surgical subspecialties.

Conclusion

Preliminary data covering Match trends from 2018 to 2022 shows a broad spectrum of specialties chosen by SCC graduates. Further study over time may establish stronger trends toward certain specialties and may be useful to inform both administration at the SCC and those at other schools interested in establishing RMCs.

Gender disparities in otolaryngology head and neck surgery (OHNS) residency awards

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Introduction

Gender disparities are well established in the surgical field, despite increasing prevalence of women in surgical specialties. This study aims to evaluate gender disparities in otolaryngology residency training with a focus on awards in residency.

Methods

122 OHNS training programs were asked to participate in a survey regarding women and OHNS residency awards. Primary outcome measures were total number and percentages of award recipients that were women.

Results

15% of programs contacted participated in our survey. Data was gathered from 20102019. Women were disproportionately awarded in all residency programs except one, in which they were over-awarded. Overall, women were found to be 42% less likely to receive a residency award compared to men (OR, 0.58; 95% CI, 0.42 to 0.81; P = 0.001). Statistical significance was identified in awards of academic excellence, where women residents were found to be 54% less likely to receive an award, as well as in teaching awards, where women were 51% less likely to receive an award. When addressing whether the responder believed gender bias existed in otolaryngology residency, 58% felt there may be some bias, while 24% responded yes, and 12% responded no.

Conclusion

Gender inequalities exist at several stages within an individual's academic career including at the resident trainee level. This study demonstrates that women are disproportionately distributed residency awards when compared to their male colleagues in OHNS. Knowledge of these disparities must be made to prevent a negative longstanding impact on women residents within OHNS programs.

Direct stimulation of the superior laryngeal nerve for objective assessment of airway protection - A feasability study in rats

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Introduction

Prevention of aspiration pneumonia is a primary healthcare goal, but efforts are hindered by the lack of objective markers to accurately measure and predict one's degree of laryngeal dysfunction and aspiration risk. The aim of this work-in-progress is to develop an electrical stimulation protocol to reliably evoke the laryngeal adductor reflex (LAR) and permit objective evaluation of laryngeal airway protection using our lab's custom laryngeal motion tracking software. While our initial efforts involve an invasive surgical approach in rats, our end-goal is translation to people using noninvasive surface stimulation of the anterior neck.

Methods

Cadaveric rat specimens (n=18) were used for surgical protocol refinement in preparation for terminal surgical trials, which have been completed in 4 of 10 Wistar rats (6-12 weeks old, either sex). The surgery entails isolating the superior laryngeal nerve (SLN) in the ventral neck and draping it over bipolar electrodes for 1 Hz stimulation using various waveform parameters to determine the combination that reliably evokes the LAR, confirmed via transoral laryngoscopy and laryngeal EMG.

Results

We established an efficient surgical protocol for SLN isolation, which informed refinement of our surgical equipment (for unimpeded SLN access) and selection of EMG electrode type and intramuscular location (for robust laryngeal recordings). Testing is underway with the remaining 6 rats to determine the stimulus waveform parameters that reliably evoke the LAR.

Conclusion

Once developed, our LAR protocol can serve as a maximum performance task to permit assessment of airway protection and treatment response over time in translational rat models.

Radiologist assessment on the quantification of regional pulmonary ventilation changes in hyperpolarized 3HE MRI on lung patients following treatment

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Introduction

Hyperpolarized gas (HPG) MRI has the potential of producing high-quality images of lung ventilation. Here, we present an algorithm for quantification of regional pulmonary ventilation changes in lung patients using hyperpolarized 3He MRI pre-and-post treatment. We validate the results with a radiologist evaluation for accuracy. Our hypothesis is that the change map would be in congruence with a radiologist's visual examination.

Methods

For calculating regional ventilation change maps on two-timepoints, image registration were performed. The difference in the voxel signal intensity was calculated for baseline to post treatment. Difference-map voxel values of >60% of the baseline mean signal value were identified as improved and those of <-60% were identified as worsened. Furthermore, during the calculation of three-timepoints, short-term improvement was identified in which voxels improved at timepoint 2 but returned to normal at timepoint 3. A grading rubric was developed for radiologist scoring that had the following assessment category: "level of volume discrepancy" and "discrepancy causes" for each ventilation change map.

Results

According to the radiologist score, of the all the cases, the volume discrepancies in the change map were small or none on 95% of the data. Two cases were found to have moderate and large volume discrepancy.

Conclusion

Our regional change maps demonstrated congruence with visual examination and may be a useful tool for clinicians evaluating ventilation changes longitudinally. To our knowledge, this is the first time, regional ventilation change map of HPG MRI has been scored by an expert and exhibited good agreement.

Lessons learned compiling data from multiple clinical sources to understand differences in post-surgical shoulder pathology in diabetics and pre-diabetics

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Introduction

We sought to examine differences in post-surgical outcomes for shoulder joint pathology between those with diabetes and those with pre-diabetes. However, the process of collecting and identifying patients for this study were complicated and required multiple data requests as well as utilizing multiple primary data sources across the MU Health System.

Methods

Rotator cuff repair procedures during the 2015 – 2020 calendar years were considered and post-surgical outcomes included clinical as well as patient reported outcomes (SST, ASES, SANE, and pain scores). Multiple sources of data were required to obtain all outcomes and patient characteristics, all of which used different identifiers for indexing. These included laboratory results for A1c, patient reported outcomes, medical history and comorbidities, as well as post-surgical outcomes related to revision surgeries, reoperations, injections, and infections.

Results

Patients who received rotator cuff repair surgery were identified using administrative billing data from the surgical billing department and a second list of patients obtained from a database of the whole health system. Patient reported outcomes were available using manual data extraction from yet another database. Different numbers and patients were obtained from the different data sources, causing concern for data completeness and quality health-system wide.

Conclusion

The original research question was complicated by requiring data from multiple resources with different data management and administrative processes. A clearer understanding of where needed data was located, the process to obtain data, and understanding the patient identifiers required likely would have lessened the time and administrative burden for data collection.

Diabetes control in a student-run free clinic during the COVID-19 pandemic

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Introduction

Student-run free health clinics (SRFCs) provide medical care to vulnerable populations throughout the United States. The COVID-19 pandemic had a significant impact on the delivery of healthcare and demanded a rapid adjustment in care delivery methods in both resource-rich and resource-poor settings. The aim of this study is to evaluate the impact of the pandemic on the management of chronic disease, specifically diabetes.

Methods

Patients with diabetes who received care continuously throughout the prepandemic (face-to-face) and pandemic (telehealth) study periods at MedZou Community Health Center, a SRFC in central Missouri, were evaluated. This sample of patients (n=29) was evaluated on six quality measures including annual eye exams, blood pressure, hemoglobin A1c, chronic kidney disease monitoring, flu vaccination, and statin therapy.

Results

Overall diabetes care, as measured by the number of quality measures met per patient, decreased by 0.37 after the onset of the pandemic. The median COVID-era ranks were not statistically significantly different than the pre-pandemic ranks (z=1.65, P=0.099). Fewer patients received an influenza vaccination the year following the onset of the pandemic (10.3%) compared to the year before the pandemic (37.9%; difference in proportions 0.276, 95% CI 0.079, 0.473; p=0.005). No other individual measures of diabetes care statistically differed significantly in the year after the pandemic began. Twenty-six (90%) patients received diabetes care using telehealth after the onset of the pandemic.

Conclusion

Diabetes care using telehealth in a SRFC may be an acceptable alternative model when face-to-face visits are not feasible. Observed decreases in diabetes-related clinical quality measure performance warrant further study.

Patients presenting to University of Missouri emergency departments following opioid overdose show elevated rates of Hepatitis C and limited testing history

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Introduction

Hepatitis C Virus (HCV) cases increased 3.8-fold between 2010 and 2017 due, in part, to increasing injection drug use and surveillance. Further, multiple HIV outbreaks in Europe and North America have been attributed to injection drug use. Emergency departments are uniquely situated to address these infections among people using opioids, given their limited utilization of other healthcare resources. This review assesses the prevalence, testing history, and potential benefit for screening of HIV and HCV amongst patients presenting to the emergency department following opioid overdose.

Methods

134 UMHS emergency department encounters for 121 unique patients diagnosed with poisoning by opioids between January 2021 and May 2022 were included in the analysis. Emergency department, most recent primary care visit, and laboratory results from January 2000 to May 2022 were reviewed for history of HIV and HCV testing and viral load.

Results

Forty-eight patients had a history of HCV testing and fifty-four had a history of HIV testing (less than 50 % of presenting patients). Of those tested, 20 were positive for HCV (42%), and 1 had a positive HIV test (2%). Eight had detectable HCV viral loads, 6 were virologically suppressed, and 6 had no documented quantitative testing. One HIV patient had detectable viral load.

Conclusion

There is a substantial burden of HCV amongst individuals who present to UMHS emergency departments following opioid overdoses. Universal opt-out HCV screening for individuals being observed following an overdose could detect many unknown HCV infections.

Skin conductance measures as possible predictors of response to propranolol for anxiety in autism spectrum disorder

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Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental condition with core features that include impaired communication, restricted interests, and repetitive behaviors. Studies have also observed higher sympathetic tone and anxiety in ASD individuals. Because sweating is solely controlled by sympathetic activity, these actions can be quantified by increases in electrical skin conductance levels (SCL). Elevated SCL are also associated with anxiety. Currently, there is no diagnostic biomarker or proven pharmacological means of treating the hallmark features or mood disturbances of ASD. Propranolol, a beta-blocker, counteracts physiologic sympathetic responses and exhibits anxiolytic effects. However, more research is needed to better understand its anxiolytic role in ASD. We previously investigated propranolol for anxiety in an open-label ASD study and found anxiety was significantly improved. We then became interested in determining whether SCL may predict which ASD patients will be most responsive to the anxiety-reducing effects of propranolol.

Methods

Data from 16 ASD patients ages 7-24 was examined in this initial analysis. Anxiety was one of several behavioral sub-domains evaluated using the Clinical Global Impression of Severity (CGIS) scale. SCL and other indicators of sympathetic activity were measured at baseline and week 12 of an open-label propranolol trial.

Results

No association was observed between SCL and reduction in anxiety with propranolol. However, repetitive behavior, another sub-domain examined, shares a significant positive correlation with SCL.

Conclusion

Further research is warranted to identify whether biomarkers of sympathetic activity and common features of ASD may predict patient response to propranolol. We hope our ongoing data analysis will impact future ASD treatment.

Reducing opioid utilization with liposomal bupivacaine in postoperative lumbar spine procedures

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Introduction

After lumber spine procedures, most patients require some form of opioid medication for pain control. Liposomal bupivacaine (LB) is a local anesthetic that has been found to last up to 72 hours post-injection. Its use has proven to be efficacious in reducing postoperative pain and opioid utilization in several surgical settings, but its utility in spine procedures has yet to be established. Based upon these findings and promising results from an observational study, our goal is to determine the efficacy of liposomal bupivacaine in lumbar spine surgery in reducing opioid utilization.

Methods

This study is a randomized controlled trial of 34 patients who underwent isolated lumbar spine procedures using a posterior approach. Patients were randomized to either LB or saline injection. Pain scores and opioid use were recorded for a two-week period following the procedure. Opioid use was converted to standard morphine milligram equivalents (MME) for comparison.

Results

17 of the 34 patients received LB. There were no statistically significant differences between the control and LB treated groups for average MME use, MME reduction, or length of hospitalization. At 6 and 10 hours postoperative, there were statistically significant reductions in pain scores in those treated with LB.

Conclusion

This study aimed to determine if there was a difference in postoperative opioid utilization in patients treated with liposomal bupivacaine compared to those who were not. There was no evidence of reductions in the amount of opioids used in the immediate post-operative period.

A series of previously-irradiated head and neck cancer patients receiving free flap reconstruction

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Introduction

Patients with local recurrence of head and neck squamous cell carcinoma (SCCa) after prior adjuvant or definitive radiation can be treated with salvage resection, and often require free tissue transfer reconstruction. Once radiated tissue is removed and replaced with non-radiated tissue, it may be possible to treat with additional radiation for local control. The long-term local complications of re-irradiation after bony free flap reconstruction are understudied.

Methods

Retrospective cohort study. Previously radiated patients undergoing bony free flap reconstruction for local recurrence of head & neck SCCa were identified. Long-term local wound outcomes, including hardware complications, were identified on patient follow-up.

Results

Thirty-five patients met inclusion and exclusion criteria. Four patients underwent reirradiation after bony free flap reconstruction. Average follow-up was 33 months. Over the study period, eleven patients had local wound complications more than 30 days after surgery. Of the patients we isolated from the database, only one of the patients who had received prior definitive radiotherapy received adjuvant radiotherapy at the University. Of the patients who had received prior adjuvant radiotherapy, only three received additional radiotherapy at the University. Only one patient who received additional radiation had wound complications.

Conclusion

Re-irradiation after bony flap reconstruction for locally-recurrent, previously radiated head and neck SCCa can be a safe option for selected patients. Larger, multi-institutional studies may identify patients at risk of local wound complications after re-irradiation.

Assessing the electronic health literacy of nursing students

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Introduction

The ability to access, evaluate, understand, and correctly apply health information from electronic sources, measured as ehealth literacy, is now a major determinant of health. Although eHealth literacy (eHEALS) has been studied in several populations, possession of this skill by healthcare professionals has not been widely explored. We therefore report a pilot study that evaluated eHEALS in a population of nursing students.

Methods

The study was a descriptive correlational survey of 42 nursing students recruited from an undergraduate research class. The eHealth literacy of participants was assessed using a fully validated eHealth literacy survey instrument. In addition, participants completed demographic questionnaires and survey to evaluate their use of the internet and social media as sources of health information.

Results

An average participant was 22 years, female (93%), went to high school in Missouri (69.8%), and had a suburban high school experience (62.8%). Average score on the eHEALS was 32.76 out of 40. There were no significant correlations between scores on the eHEALS and age, ACT scores and familiarity with social media platforms.

Conclusion

The findings of this study provide important information about the perceived ability of nursing students to retrieve reliable online health information to improve health. Nurses must be adequately equipped to provide education to clients about scientifically accurate online health resources needed to make appropriate health decisions. Nursing curricula should incorporate activities that promote nursing students' confidence and skills in accessing and evaluating accurate online resources.

EMS agencies impact bystander interventions during out-of-hospital cardiac arrest

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Introduction

Bystander CPR rates and AED use in out-of-hospital cardiac arrest (OHCA) vary widely across EMS service areas in Missouri. Both CPR and AED use by the public in OHCA are associated with increased survival to discharge. Understanding factors that are associated with increased rates of bystander CPR and AED use would potentially allow replication across lower-performing service areas.

Methods

"Measure and Improve" reports, sourced from Missouri's Cardiac Arrest Registry to Enhance Survival (CARES), were used to identify the top five EMS agencies in Missouri for both bystander CPR and AED use rates. Publicly-available population and funding data were accessed for each agency, and a phone interview was utilized to identify themes in agency practices and community AED accessibility. Descriptive statistics were used to characterize agencies with frequency analyses as appropriate. The primary endpoint was identification of replicable themes shared among the top five EMS agencies in each category. Secondary endpoints included identification of population demographic data, EMS funding data, and public AED accessibility within service areas.

Results

EMS agencies reported frequent outreach programs aimed at teaching bystander interventions. Communities with high intervention levels had public AED maps and utilized t-CPR. OHCA were not rare events, and populations tended to be well-educated.

Conclusion

Increased public interest in frequent CPR education programs and increased population density within service areas are positively correlated with rates of bystander CPR and AED use, compared to the state average.

Patterns of CD24 and CD80 expression by flow cytometry can distinguish Mantle Cell Lymphoma and Chronic Lymphocytic Leukemia/Small Cell Lymphoma from other mature B-cell lymphoproliferative disorders

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Introduction

Flow-cytometry is critical in diagnosing non-Hodgkin, mature B-cell lymphoproliferative neoplasms (BLPDs) and additional markers are needed. We investigated the utility of CD24 and CD180 in the diagnosis of B-LPDs. Few studies have investigated CD24 and CD180 independently, however, none has examined patterned expression of both CD24 and CD180 in B-LPDs.

Methods

We retrospectively analyzed flow-cytometry cases of B-LPD tested with CD24 and CD180 at University Hospital from 2016-2020. The sample (n=168) included 99 cases of CLL/SLL, 22 of MCL, and 47 other B-LPDs. Data were collected/gated via FACSCantoII/FACSDiva (BD Biosciences). Deidentified CD24/CD180 scatterplots were qualitatively coded negative or positive (dim/moderate/bright/heterogenous) by two pathologists, blinded to final diagnosis. The frequency of coded patterns was compared using Fisher exact t-tests.

Results

Among all B-LPDs, bright CD24+ expression was significant (p=0.0007) with 73% sensitivity, 66% specificity, 25% PPV, and 94% NPV for MCL. Dim 180+ expression was significant (p=0.0002) with 51% sensitivity, 57% specificity, 84% PPV, and 21% NPV for CLL/SLL. Subgroup analysis found that bright CD24+ remained significant (p=0.0015), with 73% sensitivity, 66% specificity, 32% PPV, and 92% NPV for MCL compared to CLL/SLL. Dim 180+, however, was not associated with CLL/SLL in the restricted, CD5-positive (CLL/SLL and MCL) cohort.

Conclusion

Bright CD24+ and dim CD180+ appear useful in distinguishing MCL and CLL/SLL from other B-LPDs. Bright CD24+ is an effective MCL screen that further differentiates MCL from CLL/SLL. CD24 is also a prognostic marker in many solid tumors and is a potential therapeutic target. Both markers show promise to improve classification of mature B-LPDs.

Serial subtraction by sevens significantly alters dominant limb knee adduction during lateral step-down when compared to the stroop color-word test

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Introduction

Dual-tasking pairs movement and cognitive tasks to simulate real-world movement conditions. Effects of dual-tasking on lateral step-down (LS) kinematics have not been investigated. Therefore, this study evaluated effects of two different types of dual-tasking on knee adduction during LS.

Methods

Nineteen healthy individuals (22.05±1.61 yrs., 173.92±9.21 cm, 67.99±12.65 kg) participated. Participants completed 5 repetitions of LS, from a 15 cm box, for each leg and testing condition (Stroop, and serial seven (SS)). For the Stroop condition, participants were presented a list of colors printed in a nonmatching ink color and read the ink color. For the SS task, participants serially subtracted the number seven from a random number. An electromagnetic motion sensor was attached to the femoral epicondyles via compression clamp. Another sensor was attached 2 cm below the ipsilateral tibial tuberosity. Outcome measures included discrete knee adduction/abduction (lower values indicate greater adduction) at peak flexion for each LS repetition. Paired samples t-tests were used to compare outcome measures between conditions for each leg.

Results

Statistical analysis showed significant differences in only left leg knee adduction at maximum knee flexion between Stroop (*M = -1.66, SD = 2.84)* and SS *(M = -2.14, SD = 2.88)* conditions *t(18)=-2.72, p=.014, 95% CI = -0.86-0.11*.

Conclusion

With 18 of our 19 participants as right leg dominant, these findings suggest the SS dual task effects knee abduction in the nondominant limb to a greater degree when compared to the Stroop task. Future research should be conducted involving more variability in leg dominance.

Perinatal COVID vaccination and breastfeeding: Influences on decision-making

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Introduction

Perinatal women are at increased risk for severe illness or death from the COVID-19 virus versus non-pregnant women. Approximately 1 in 3 pregnant women in the U.S. are not fully vaccinated against COVID-19. Skepticism around vaccine safety in the perinatal period continues. The goals are to explore how habitus impacts 1) perinatal women's vaccination decisions and 2) the decision to breastfeed.

Methods

Using the concept of habitus as a "lens" to evaluate decision making, a semistructured interview guide was developed from four constructs that constitute habitus: childhood socialization, education, social class, and predominant feeding in the community. Approximately one-hour interviews throughout August-September 2022 (n = 12) were conducted with mothers over Zoom. Transcripts were analyzed using NVivo software.

Results

The participants were primarily Caucasian, average age of 33, multipara, and had breastfed for at least one year. Major overlapping themes for vaccination and breastfeeding decision 1) reflects the degree of lived experiences outside of the community and 2) protecting their baby by passing on material immunity from the COVID-19 vaccination. The major themes for breastfeeding decision 2) are earlier exposure to breastfeeding and 3) ease of access to resources to support breastfeeding. One expected theme that did not surface was women did not indicate they lengthened the time of breastfeeding to protect against COVID19.

Conclusion

Although the benefit of breastfeeding was well known, women's interactions both as a child and adult with lactating women mattered and this knowledge can guide health care providers in supporting women's decisions around breastfeeding.

Bile acid synthesis and signaling in the central nervous system

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Bile acids (BA's) and oxysterols have well documented functions and implications in hepatic and cholestatic diseases, serving to solubilize dietary lipids and fat-soluble vitamins and act as steroid hormone signaling molecules in metabolic processes. Though BA's are mainly produced in the liver, regulated by the gut microbiota, and function within enterohepatic circulation, recent studies have identified the presence of BA's and their receptors in the central nervous system (CNS). This poster explores the alternative and neural BA synthesis pathways, BA permeability to the BBB, functions of BA receptor stimulation in the CNS, and BA receptors expressed in the CNS whose function remains unknown. The role of BA signaling in neurodegeneration and other neurological disorders is increasingly being researched, and provides a link between the gut microbiome, metabolic signaling pathways, and CNS pathophysiology. Multiple Sclerosis (MS) is an immune mediated neuroinflammatory and demyelinating disease in which aberrant BA signaling may play a role. Alterations in BA signaling pathways and BA receptor expression have been identified in people with MS and mouse models with induced encephalomyelitis and demyelination. Recently, mouse models have linked oral BA supplementation with decreased severity of demyelination, however, this mechanism is not fully understood. Receptors identified in the CNS which respond to BA's should be studied further as potential targets for neurological disorder therapy, especially in demyelinating and neuroinflammatory disorders like MS.