Indiana University Student Research Symposium

The following works were accepted for presentation at the Indiana University Student Research Symposium, which serves to highlight student research from all levels of experience in order to ignite interest and support for scientific inquiry in the IUSM medical community.

A 4-year-old Girl with Delayed Motor Milestones and a Renal Mass

Shah R, Mohamed D, Ramos-Platt LM, Grikscheit TC, Zhou, Kenneth

A 4-year-old Hispanic female presented with delayed ambulation at 3 years of age, inability to climb stairs, and frequent falls. Physical examination was notable for proximal muscle weakness of the lower extremities, mild distal muscle weakness of the upper extremities, muscle hypertrophy, elbow and ankle contractures. Serum creatine kinase at presentation was 1,499 units/liter. Pulmonary function tests revealed mild hyperinflation and reduced ventilatory muscle strength. An echocardiogram demonstrated normal cardiac anatomy with mild left ventricular hypokinesis (shortening fraction, 24.4%). Six months later, she presented with abdominal distension, acute onset right flank pain, vomiting, hypertension, and anemia. Computed tomography revealed a 9 x 9 x 7 cm mass arising from the inferior pole of the right kidney. The patient was admitted to a tertiary care children's hospital and evaluated by neurology, oncology, anesthesiology, pulmonology, cardiovascular surgery, pathology, and radiation oncology. Our multidisciplinary panel of experts will discuss the evaluation of the etiology for delayed motor development followed by diagnosis and collaborative clinical reasoning for the risk-adapted management of a renal mass.

Following the Track to an Unexpected Diagnosis: Phaeohyphomycosis

Mohammed A, Rahnama S

Presentation: A 77-year-old man with a history of diffuse large B-cell lymphoma (DLBCL) and 7 cycles of chemotherapy (CHOP) plus rituximab presented to the dermatology clinic with a nodule overlying the left 5th dorsal metacarpal phalangeal (MCP) joint of 2-3 months duration.
Assessment: On exam, he had a scaly rubbery pink-brown nodule to the left dorsal hand with some heme crust at the center of the lesion-this lesion was non-tender. At the left forearm there were a series of 3 rubbery pink-brown non-crusted papules, linearly arranged. He noted that they occurred around the time he participated in a home renovation. The biopsy of both locations showed pigmented hyphae. Skin tissue was cultured, and Exophiala jeanselmei was found.
Diagnosis: The patient was diagnosed with phaeohyphomycosis, caused by dematiaceous fungi which live worldwide in soil, trees, and decaying vegetation. Infection with such organisms can usually be traced to inoculation, from a source as simple as a splinter. Because phaeohyphomycosis often disseminates to many organs, cardiac and cerebral tissue can be involved, resulting in high mortality (case series report 80%) particularly if the central nervous system (CNS) is affected.
Management: Itraconazole at initial doses of 400 mg/day for at least 6 months is commonly used in treating this group of infections. Due to a potential interaction with an azole antifungal and the patient's amiodarone used for atrial fibrillation, oral terbinafine 250 mg daily was used. On follow-up, the patient noted that the lesions had increased in size and had become tender. Given his continued headaches and sinusitis, he received an MRI of the brain with contrast, which did not show CNS involvement. Terbinafine and amiodarone were discontinued, and the patient was started on voriconazole 200 mg twice a day. After 6 weeks of therapy, the tenderness decreased and the lesions flattened, and the patient did not have recurrence on follow-up.

Melasma and its Effects on the Quality of Life in Patients living in the United Kingdom

Osborne R, Nalluri R

Melasma is a skin disorder that causes discoloration of the face and arms. This disease occurs predominantly in people of color, most commonly women. Although the disease is clinically benign, severe discolorations of the skin can be both psychologically and socially damaging. In the United Kingdom however, the extent of this psychosocial damage has yet to be explored. The aim of this study is to assess the quality of life in melasma patients of color, in Manchester. This is a retrospective review of case notes of melasma patients who attended the dermatology department between August 2018 and August 2020. A total of 16 case notes of melasma patients ranging between the ages of 34 to 60 were studied. The patients completed two quality of life questionnaires, Dermatology Life Quality Index (DLQI) and Melasma Quality of Life Scale (MELASQoL); and Modified Melasma Area and Severity Index (mMASI) was completed by a single dermatologist to assess melasma severity. The mMASI score ranges between 0-24, with a higher score indicating higher disease severity. The DLQI score ranges between 0-30 and the MELASQoL score ranges between 0-70, with higher scores indicating poorer quality of life.
The overall mean mMASI score was 4.67 ± 2.86. The overall mean DLQI was 18.3 ± 8 and the overall mean MELASQOL was 62.6 ± 8.80. The results show that melasma has a significant negative impact on the quality of life in patients living in the UK. Patients struggled the most with appearance and social interactions. Issues with frustration and attractiveness were equally troubling to patients. In addition, the DLQI and MELASQOL scores from this study were higher than those from Australian, Brazilian and French studies. This suggests that melasma patients living in the UK may have a poorer quality of life than those living in other countries. These findings support the need for more aggressive forms of treatment for these patients, in order to improve their overall quality of life.

Effective Substance Abuse Treatment: Inpatient Bridges to Outpatient Care

Blaettner B, McKinzie A, Young A, Crawford J, Robles M

Women have been affected disproportionately by the opioid epidemic. From 1999 to 2017, overdose deaths in men increased by 225%, while those in women have increased by 270%. Research shows that women are more likely to be prescribed opioids, be diagnosed with chronic pain disorders, and experience negative outcomes associated with opioids. A 46-year-old female with a history of daily IV heroin and crack cocaine use presented with symptoms secondary to septic emboli. During her stay, she met with an addiction medicine physician to address her substance use disorder (SUD). She was discharged on a 7-day prescription of suboxone with referral to follow up in an outpatient addiction clinic within the week. She follows up at an addiction clinic bi-monthly and is now 3 years sober. Current strategies to address opioid addiction, such as social work consultation and referral to outpatient addiction management without inpatient treatment, have proven to be suboptimal. Research shows that initial inpatient pharmacological therapy with referral to outpatient addiction management increases rates of post-discharge abstinence and decreases rates of readmission related to opioid use disorder. With about a quarter of hospitalized patients having SUD, it is a necessity and priority to build a concise plan on starting inpatient treatment. Specifically, research indicates the effectiveness of starting inpatient buprenorphine with briding to outpatient services. Medications for SUD are under prescribed and most hospitals lack inpatient addiction services. Different models have been outlined for a multi-step approach on inpatient addiction consult services. These models include a universal screening approach for substance misuse, complete addiction history, withdrawal management, referrals and linkage to an outpatient center, and long-term medication titration. For optimal results, the clear choice is starting inpatient buprenorphine with bridging to outpatient services.

Early Allograft Dysfunction to Assess the Liver Function following Liver Transplantation

Bolujo I, Aref M, Ekser B

Background: Early allograft dysfunction (EAD) can be used as a tool to assess the function of the liver after transplantation. Currently, the most accepted EAD definition is: Total Bilirubin >10 mg/dL on post-operative day 7, INR >1.6 on post-operative day 7, ALT or AST ≥2000 IU/L within first 7 days. EAD is associated with mortality and morbidity after liver transplantation which leads to decreased recipient survival rates. It is, in fact, considered as an early sign of an eventual graft loss.
Methods: We have performed a literature review to understand what risk factors increase the risk of EAD, including donor and recipient demographics as well as recipients' MELD (Model for End Stage Liver Disease) scores, which predicts patients' disease severity. We also compared the incidence of EAD between our center and the literature.
Results: We found that the incidence of EAD was between 23-40% (Table 2). It is higher when livers from donation after circulatory death (DCD) donors were used, as expected due to increased ischemia reperfusion injury.

Reference (year)	Number of patients	Incidence of EAD
Ekser et al (2019) (IUSM)	n = 2008	29%
Olthoff et al (2010)	n = 300	23%
Wadei et al (2015)	n = 1325	27%
Lee et al (2014)	n = 205	39.5% (DCD donors)

Risk factors that can result in an increased occurrence of EAD were; (i) donor age, (ii) liver stenosis, (iii) expanding criteria for donor livers, such as DCD (iv) prolonged warm ischemia time (WIT), and (v) cold ischemia time (CIT). Histologically, hepatocellular damage that is shown as coagulative necrosis can be seen immediately after reperfusion.
Conclusions: During our literature review, potential strategies have been discovered to help prevent EAD including pharmacological treatment using glucose, antioxidants, anti-inflammatories, and apoptotic drugs. Although none of them significantly prevented the occurrence of EAD, it was clear that there are many tools that can be used to attempt to prevent EAD in order to offer a better outcome in patients undergoing liver transplantation.

The Role of Body Mass Index on Perioperative Medical Complications and Outcomes Following Primary Total Knee Arthroplasty

Bosler A, Deckard E, Ziemba-Davis M, Buller L, Meneghini R

Background and Hypothesis: Obesity is associated with increased medical complications and septic revision following total knee arthroplasty (TKA). This study examined the relative influence of body mass index (BMI) on outcomes following TKA in an arthroplasty program with specialized perioperative medical care.
Experimental Design or Project Methods: 284 consecutive primary TKAs performed by one surgeon between 2019 and 2020 were retrospectively reviewed. Outcomes including (1) inpatient and 90-day medical complications (cardiac, renal, respiratory, venous thromboembolism, cerebrovascular accident, joint infection, sepsis, and death), (2) 90-day emergency department visits and hospital readmissions, and (3) 90-day reoperations on the index joint were evaluated in relation to BMI.
Results: There were no differences in the proportions of obese (BMI ≥ 35 kg/m2) and non-obese (BMI< 35 kg/m2) patients with any of the assessed complications ($p \geq 0.160$) during the index stay or after discharge. All complications were related to renal, respiratory, or cardiac issues or joint infection. The five reoperations of the index joint were performed for infection or arthrofibrosis as the underlying

cause.
Conclusion: We observed a similar distribution of perioperative medical complications following primary TKA regardless of BMI. Findings suggest that evidence-based multidisciplinary perioperative care coordination can optimize outcomes in obese patients.

Early identification of personality and substance use disorders in improving outcomes of mood disorders in the transgender population

Campbell N, Stevens K, Fulton K, Raza M

Case Description: A 29 y/o male-to-female (MTF) transgender patient with a past medical history of schizoaffective bipolar type, gender dysphoria, and obsessive-compulsive disorder, presented to the emergency department for suicidal ideation. Patient had nine prior hospitalizations related to suicidal ideation and a significant social history of daily marijuana use. Clinical Significance/ Conclusion: Mood disorders and suicidal ideation is a detrimental combination in the general public, and even more so in the transgender population. In the US, the prevalence of mood disorders is approximately 46% in the transgender population versus 9% in the cisgender population. Several studies have shown the positive relationship of psychiatric disorders and suicide ideation. Among transgender populations, female-to-male individuals have the highest rates of suicidal ideation at 50.8% and male to female at 29.9%. Previous research demonstrates a path from stigma to sickness: transgender individuals are at greater risk of discrimination, unemployment and underemployment, poverty, harassment, abuse and violence. These factors contribute to worsened states of emotional and social well-being coupled with increased risk-taking behaviors. Combined with inadequate healthcare due to neglected sexual health, research draws connections between stigma and sickness. It is important for health care providers to recognize personality and substance use disorders in the transgender population. Whether male to female or female to male, women are suffering with mental illness that can lead to suicidal ideation. As undertreatment may contribute in provoking suicidal ideation in patients with mood disorders, early identification of these comorbid conditions could lead to better care and outcomes for transgender patients.

Rapid Resolution of Megestrol Acetate Associated Adrenal Insufficiency

Steele E, Afshari S, Swapnil K

Introduction: Megestrol acetate (MA) is a synthetic progestin commonly used for appetite stimulation. Several case reports have associated use of MA with adrenal insufficiency (AI) through suppression of the hypothalamic-pituitary-adrenal axis. To our knowledge, our case is the first to establish a timeline of onset and resolution of AI associated with MA.

Case: We present a 52-year-old female with a past medical history significant for hypothyroidism, systemic lupus erythematosus, Raynaud's, chronic diarrhea, anemia, and reflex sympathetic dystrophy. She was admitted for small bowel obstruction requiring exploratory laparotomy with lysis of a single adhesion. She developed hypoglycemia blood glucose ranging from 55-60mg/dL on hospital day 24, after starting nocturnal nasogastric tube feedings. She had poor appetite, weight loss, and intermittent nausea. She did not have a history of exogenous steroids. Physical exam was unremarkable aside from cachectic-appearing body habitus with a BMI of 17. Vital signs were stable. Her TSH, renal function, and liver studies were normal. Serum cortisol was checked on hospital day 27 and was very low, 1.1 mCg/dL (normal range, 5-25 mCg/dL). Endocrine was consulted for evaluation of hypoglycemia and adrenal insufficiency (AI). She had an adequate cortisol response to a 250 mcg cosyntropin stimulation. However, baseline ACTH was inappropriately normal, given her very low serum cortisol, suggesting secondary AI. Upon detailed chart review, we noted that she was started on megestrol acetate (MA) 20 mg PO daily on hospital day 20 for appetite stimulation. We suspected megestrol acetate to be the cause of her secondary AI and hypoglycemia. Within three days after discontinuation of MA, the patient's hypoglycemia resolved and serum cortisol returned to normal.
Discussion: Megestrol acetate is a synthetic progestin frequently used as appetite stimulant. MA is known to have glucocorticoid properties with affinity for glucocorticoid receptors. There are several case reports associating MA with AI which is a potentially life-threatening condition. The mechanism is thought to be suppression of the HPA axis. AI has been noted with doses of 400-600 mg however exact dose and timeline has never been described. Our case is unique where she developed AI after a relatively very low dose of 20 mg daily for only 1 week. Within three days following identification of the possibility of MA as the inducing agent and subsequent discontinuation, the patient's AI resolved. This rapid recovery is remarkable and gives important insight about possible impact of dose and duration in resolution of AI associated with MA. MA is frequently used as an appetite stimulant and it is very important to be aware of potentially life threatening side effects of AI. A timeline for development of MA induced AI and resolution has not been shown in previous case reports; ours is the first case to outline the dose and timeline for recovery, although further research is needed to confirm

The Effects of Multiple Exposure Ethanol on Barrier Tightness and Passive Permeability in a Human Stem Cell Derived Blood-Brain Barrier Model

Stoffel RD, Bell KT, Canfield SG

Background and Hypothesis: Numerous animal studies have shown the negative aspects of ethanol at sustained concentrations as well as the intense depressive effects of multiple ethanol exposures on the central nervous system. Chronic ethanol use as a possible contributor to early onset neurocognitive decline has been indicated. A portion of these studies have implicated that ethanol exposure induces blood-brain barrier (BBB) impairment; however, these effects are not completely understood. In humans the BBB serves as a protective barrier that restricts the passage of nutrients, metabolites, and pathogens into the central nervous system from the blood and is essential in protecting the brain tissue from harmful substances. We hypothesize that multiple doses of pathologically-relevant ethanol will cause decreased BBB tightness and increase passive permeability.
Experimental Design: In this study, we utilized brain microvascular endothelial cells (BMECs) derived from human induced pluripotent stem cells (iPSCs) to assess the effects ethanol has on barrier tightness and passive permeability through the BBB. BMECs were treated with multiple exposures of 50mM ethanol and transendothelial electrical resistance and sodium fluorescein permeabilities were measured. Trolox, a free radical scavenger, was used to identify if ethanol-induced barrier damage could be salvaged by reducing its oxidative impact.
Results: Upon multiple exposure treatment with ethanol, iPSC-derived BMECs displayed diminished transendothelial electrical resistance and elevated sodium fluorescein permeability when compared to non-treated BMECs. Additionally, BMECs that were treated simultaneously with Trolox and ethanol had reduced barrier damage compared to ethanol treatment alone.
Conclusion and Potential Impact: From these results, we conclude that multiple ethanol exposure-induced barrier damage in iPSC-derived BMECs, is in part due to elevated oxidative stress. Disruption of the BBB can potentiate a number of negative effects on the brain parenchyma and can lead to earlier onset neurocognitive decline. Alcohol's impact on the BBB must be studied to ensure we limit these effects.

A cases series of COVID-19 in pregnancy outcomes

Swiezy S, Eckert N, Campbell M

Introduction: COVID-19 has been the largest public health crisis of our lifetime. Much of the morbidity and mortality caused by COVID-19 has been due to lack of adequate research and understanding of the virus. In the absence of data for COVID-19, scientists have used evidence collected during other coronavirus outbreaks, including SARS and MERS, to forecast outcomes in different populations. Both of these coronavirus outbreaks were preferentially fatal in pregnant women, suggesting that COVID-19 may also have grave consequences for gravid women and their fetuses. Given that molecular studies have confirmed that COVID-19 enters cells through the ACE-2 receptor, which is also present on human placental cells, there is potential for COVID-19-induced abnormalities in the interface between mom and baby, leading to maternal-fetal morbidity or mortality. To date, several case series have demonstrated adverse perinatal outcomes in COVID-19-positive pregnant women, including placental abnormalities and pre-term birth; however, these studies have been limited in scale and scope. More data is needed to fully understand the implications of COVID-19 infection in pregnancy so that evidence-based treatment recommendations can be made to OB/GYNs caring for COVID+ patients.
Methods: We reviewed the charts of all of the pregnant women presenting for routine obstetric care to the UAP OB/GYN offices of Dr. Thomas Yeagley and Dr. Kathleen Coutinho in Terre Haute, IN between November 2020 and February 2021, which represented the main case spike for Terre Haute. We used the "chart search" function as well as prenatal visit records and labor and delivery notes to identify 34 women who were pregnant at the time of COVID-19 infection. Inclusion criteria was as follows: pregnant women with 1) a COVID positive test or 2) symptoms and a household contact (e.g. husband) with a COVID positive test. Patients were excluded if the date of COVID positive test for self or household contact was unable to be determined within an accurate two-week time frame. Data were inputted into a Qualtrics survey, developed by the study authors, for ease of viewing the results.
Results/Conclusions: Data input is ongoing. We are currently waiting for ~25% of the patients in our sample to deliver in the next 4-6 weeks in order to evaluate any perinatal or post-partum complications that occur due to COVID-19 infection. We plan to stratify our data by the trimester of pregnancy during which COVID-19 was acquired. Limitations of our study include small sample size and review of patients from only two OB/GYNs. A thorough review of our data will provide meaningful insight into the association between COVID-19 and pregnancy so that best practices can be developed and implemented for the care of these patients.

Barriers to Care and Missed Appointments in an IUSM Student-Run Free Clinic

Swiezy S, Eckrote E, Ratcliffe B, Black M, Danek R, Reyes E

Introduction: Missed primary care appointments represent a potential cause for negative health outcomes in patients. As student clinicians, we have a responsibility to make sure patients with missed appointments are consistently and efficiently contacted for two purposes: 1) to reschedule

appointments to facilitate access to needed care and 2) to assess the structural barriers that cause our patients to miss their appointments and experience delays in preventive assessment, treatment, and diagnosis. Mollie Wheat Memorial Clinic (MWMC) has been serving the Wabash Valley for six years now, and we are at a critical juncture to undertake a study to evaluate the reasons that we continue to have a high rate of no-show patients at our clinic, and, to use this data to implement solutions for the barriers to care experienced by our unique patient population.
Methods: MWMC is open every other Saturday from 8a-noon. Patients who presented for a scheduled appointment ("show") or presented as a walk-in ("walk-in") on clinic dates from March-May were surveyed for demographic information as well as barriers to care, including transportation, housing, insurance status, health literacy, and clinic hours availability. Patients who were a no-show ("no-show") for their scheduled appointment, over the same period, were contacted via phone to understand the reasons for the missed appointment and how this could/could not have been prevented by MWMC. No-show patients were subsequently emailed a copy of the same survey given to patients at the clinic. Comparison of "show"/"walk-in" vs. "no-show" groups was undertaken to understand the differences in economic, social, and structural barriers that allowed some patients to present for and others to miss their appointments.
Results: Data collection is ongoing in this project. Thus far, we have gathered a sample of "show"/"walk-in" patients (n = 24) and "no show" patients (n = 3). Preliminary data analysis reveals several barriers to care faced by our patients. Many of our patients (25%) answered that they do not have access to their own car for reliable transportation, and several (20.8%) regularly rely on someone else for their transportation to and from work, school, appointments, and the grocery store. Half (50%) of our patients reported that they are more than 20 minutes from our clinic, with some traveling an hour by care to utilize our free services. The majority of our patients (62.5%) reported having no insurance, with over half (53.3%) of the uninsured group citing "because it is too expensive" as the reason for being uninsured. A significant portion of our patients are unemployed (29.2%). Additionally, several of our patients (25%) answered that they have gone without food because they could not afford it, and some (12.5%) reported being evicted from their homes because they were unable to make rent. Most of our patients (70.8%) reported that they do not have a family doctor. Qualitative data through speaking with our no-show patients on the phone revealed a number of the same barriers preventing them from making it to their scheduled healthcare appointments, with the most common barrier being transportation to and from the clinic.
Conclusions: Preliminary data suggests that several structural barriers to accessing care at our clinic affect our patients, including transportation, proximity to free healthcare, and SES, among others. Subsequent to our study, we plan to propose solutions to our MWMC executive board aimed at addressing these issues for our patients and, thereby, decreasing the rate of missed appointments at our clinic. We plan to continue tracking rates of missed appointments after the implementation of the proposed solutions in order to evaluate their efficacy.

Power-Optimizing Repair for Distal Biceps Tendon Rupture: Stronger and Safer

Tadevich JT, Bhagat ND, Lim BH, Gao J, Chen WW, Merrell GA

Purpose: Many approaches have been described to accomplish tendon reattachment to the radial tuberosity in distal biceps tendon rupture with significant success, but each is associated with potential post-operative complications, including posterior interosseous nerve (PIN) injury. At present there is no consensus best approach to the repair. The purpose of this study was to evaluate supination strength and drill exit point distance from the PIN in a power-optimizing distal biceps repair and compare findings to those of a traditional anterior approach endobutton repair.
Methods: Cadaveric arms were dissected to allow for distal biceps tendon excision from its anatomic footprint. Each arm was repaired twice, first with a power-optimizing repair utilizing an anterior single-incision approach with an ulnar drilling angle and biceps tendon radial tuberosity wraparound anatomic footprint attachment, then with a traditional anterior endobutton repair. Following each repair, the arm was mounted in a custom-built testing apparatus and supination torque was measured from three orientations. The PIN was then located posteriorly and the distance to each repair exit hole was measured.
Results: Five cadaveric arms, each with both repairs, were included in the study. The power-optimizing repair generated 82%, 22%, and 13% greater supination torque on average than the traditional anterior endobutton repair from 45° supination, neutral, and 45° pronation orientations respectively. The power-optimizing repair produced drill hole exit points farther from the PIN (23 mm) than the traditional anterior endobutton repair (14 mm) on average.
Conclusions: A power-optimizing repair provides significantly greater supination torque and produces a drill hole exit point significantly farther from the PIN as compared to a traditional anterior endobutton approach.

Lost in Translation: A Case of Acute Abdomen in Pregnancy

Pandita P, Marks CE, Hand BL, Chimhanda M

Case Description: A Hispanic 29-year-old G7P4 at 25 weeks' gestation presented to triage with stabbing midline upper abdominal pain, nausea, and vomiting. History was limited by a language barrier and an interpreter was used. The patient had a BMI of 46, and upon presentation had stable vital signs and was afebrile. Labs showed mild leukocytosis, and lipase and urinalysis were negative. Gastrointestinal cocktail

trial resulted in moderate pain improvement. Computed tomography (CT) abdomen and pelvis was recommended for further evaluation, but after risks and benefits were discussed, the patient opted for an abdominal ultrasound (US). Right upper quadrant US did not show evidence of acute cholecystitis, and the patient was discharged on pantoprazole. She returned one week later with worsening right lower quadrant abdominal pain, nausea, vomiting, and guarding. CT abdomen and pelvis revealed acute perforated appendicitis with adjacent periappendiceal abscess. General surgery was consulted, and a laparoscopic appendectomy was performed.
Conclusions: This case demonstrates the difficulty in diagnosing appendicitis in pregnancy due to confounding anatomic and physiologic factors related to normal pregnancy. Diagnostic challenges also exist. While ultrasound is the primary imaging modality due to availability and low cost, obesity is associated with poor sonographic image quality.
Clinical Significance: Acute abdomen in pregnancy (AAP) represents an extensive range of etiologies, including obstetric and non-obstetric causes. Pregnant women with acute appendicitis have higher rates of adverse outcomes compared with nonpregnant women. Diagnosis of AAP is an essential step in management, and there is evidence that non-English proficiency puts patients at risk for reduced clinical investigation and adversely affects quality of care. Accurate diagnosis and optimal communication should be prioritized to ensure timely medical intervention and reduce complications.

Facebook Groups Provide Social Support to Patients After Bariatric Surgery

Athanasiadis D, Roper A, Voss A, Zike T, Hilgendorf W, Embry M, Banerjee A, Selzer D, Stefanidis D

Background: Social support after bariatric surgery is considered essential. Unfortunately, patient participation in such groups tends to be limited threatening their effectiveness. Facebook groups may provide a social support option that attracts more participation. The aim of this study was to describe our experience with the administration of a Facebook social support group and evaluate its perceived value by our bariatric patients.
Methods: After IRB approval, all Facebook group posts since its establishment in 2015 were reviewed and a thematic analysis was undertaken. Group members also completed a survey related to their Facebook group experience and its perceived value. Responses were collected using 5-point Likert scales. In addition, 30 members were phone interviewed using open-ended questions and their responses were analyzed.
Results: Over 4 years, the group accumulated 12,507 posts, 104,053 comments, and 197,594 reactions. On average, members check the group page more than once per day. Ten common themes were identified in the submitted posts: questions, motivation related, education related, diet related, physical activity related, current status updates, sharing failures, social, random/humorous and other. Members reported that the group helped them do well with their procedure (3.3/5) particularly due to the motivation of others' successful stories (3.5/5) and made them feel understood (3.9/5) even though it offered limited help controlling their eating habits (2.7/5). The phone interviews suggested that the Facebook group offered constant support, was simple to use, and provided the sole social support for many patients. They most appreciated the motivational posts that kept them on track and the assistance/comments of clinical staff. In contrast, they disliked repeated questions/spam and negative stories shared by some members.
Conclusions: Facebook groups can provide effective social support to patients after bariatric surgery. Peers educate, answer questions, and motivate patients by sharing their positive experiences. Whether this online connectedness also positively impacts patient outcomes requires further study.

Assessing the Role and Impact of a Free Community Eye Clinic

Rowe LW, Camp DA, MD, Tso HL, Wurster P, Kalafatis NE, Scheive M, Yung CR

Background: In partnership with the Indiana University Student Outreach Clinic (IUSOC), the Ophthalmology Student Interest Group at Indiana University School of Medicine operates a free monthly student-run eye clinic in Indianapolis, Indiana that provides assessments of visual acuity, intraocular pressure (IOP), peripheral visual fields, MD-provided refraction, and non-mydriatic fundus photography. Prescription glasses from LensCrafters and donated reading glasses are provided to those without vision coverage insurance. This study aimed to describe the patient demographics, review the services provided, and assess the impact of our high-volume student-run eye clinic over seven years.
Methods: Retrospective chart review of 875 patients seen at the IUSOC Eye Clinic from October 2013 to February 2020. Data on demographics, insurance coverage, ocular history, physical examination, suspected diagnosis, referral status, and glasses provided were collected and analyzed.
Results: Average Age: 46.7(±15.9); Gender: 51.1% female, 41.8% male, 7.1% undocumented; Ethnicity: 31.9% African American, 21.7% Caucasian, 21.5% Hispanic, 3.0% other, 1.0% Asian, 20.9% undocumented; Insurance Coverage: 39.2% none, 12.0% Medicaid, 8.2% Medicare, 4.8% other, 3.5% Healthy Indiana Plan, 2.4% private insurance, 29.8% undocumented Diabetes: 18.5%; Hypertension: 32.2%; Avg IOP: 18.1; IOP >21: 21.7%; Visual Acuity 20/40 or Worse: 61.4%; Near Visual Acuity 20/40 or Worse: 51.3%; Visual Field Deficits: 29.4%; Non-Mydriatic Fundus Photography: 14.6% with retinal pathology, 15.4% of diabetics screened

with retinal pathology; Avg cup-to-disc ratio: 0.36; Cup-to-disc ratio >0.6: 8.3%; Reading glasses provided: 244; Glasses prescriptions provided: 126; Referrals to Ophthalmology service at county hospital: 178 (49 for glaucoma, 39 for decreased visual acuity, 14 for diabetic retinopathy, 11 for cataracts, 5 for AMD, and 60 for other pathology); Estimated value of services provided:1053.58 RVU.
Conclusion: In providing basic eye care to nearly 900 patients since 2013, the IUSOC free eye clinic fills an important role in advancing ocular health and preventing irreversible blindness in the underserved Indianapolis community.

Choriocapillaris Vascular Flow Area as a Biomarker of Diabetic Retinopathy Severity

Rowe LW, Scheive M, Reinhart K, Hajrasouliha AR

Purpose: Optical coherence tomography angiography (OCT-A) offers the opportunity to safely and routinely image the choriocapillaris (CC), which is unable to be visualized by the established technique of fluorescein angiography. We performed a retrospective cohort study to compare the CC vascular flow area between diabetic patients with differing degrees of clinical diabetic retinopathy (DR) severity. We hypothesize that blood flow area in the CC can be used as a biomarker to correlate with clinical severity of DR.
Methods: This retrospective cohort study analyzed the measured flow area of the CC on quality OCT-A scans in non-diabetic control patients (n=206), diabetic patients without retinopathy (n=47), and diabetic patients with mild non-proliferative DR (NPDR) (n=40), moderate to severe NPDR (n=144), and proliferative DR (PDR) (n=81). A two-sample t-test was completed to compare CC flow area between control patients and diabetic patients with at least one quality OCT-A scan. A multivariate linear regression analysis was performed to compare CC flow area to clinical DR diagnosis when controlling for age, gender, and visual acuity in patients with at least one quality OCT-A scan.
Results: There was found to be a statistically significant decreased CC flow area ($p<0.05$) in diabetic patients compared to patients without diabetes. In comparison to diabetic patients without retinopathy, mild NPDR patients revealed an insignificantly increased CC flow area of 0.253 ($p=0.53$), while moderate to severe NPDR patients revealed a significantly decreased CC flow area of 0.691 ($p=0.04$) and PDR patients revealed a significantly decreased CC flow area of 1.11 ($p<0.01$).
Conclusions: CC vascular flow area, as measured by OCT-A, shows promise for the diagnosis and monitoring of DR as a biomarker of clinical disease severity. Future studies investigating longitudinal CC blood flow changes after anti-VEGF injections may be helpful in better understanding the treatment's effects.

Decoding Mouse Behavior from Neural Activity in Visual Cortex

Williams A, Makin M

Background and Hypothesis: Brain-machine interfaces (BMIs) aim to restore motor control to patients. To develop effective BMIs, it is imperative that we build highly accurate models relating cortical neural activity with natural movements. Neurons in the visual cortex of the brain respond strongly to visual signals, but are also modulated by fluctuating internal states such as alertness, which closely correlates pupil size. We thus hypothesized that an animal's pupil size can be decoded directly from the activity of a population of neurons in mouse primary visual cortex.
Project Methods: We used an open-access dataset from the Allen Institute for Brain Science, which consisted of in-vivo 2 photon calcium imaging data of 128 neurons recorded from primary visual cortex of an awake mouse viewing a video screen. Video imaging was used to track the mouse's pupil size. To relate neural activity with pupil size, we used linear regression, first smoothing the data with a Savitzky Gall filter. The model was fit on the first 80% of the data, and tested on the remaining 20%, using the computed coefficients to predict pupil size from neural activity. A Pearson correlation coefficient between the true and predicted data was computed. All analyses were performed in Python.
Results: We found that there was a strong linear relationship between neural activity and pupil size, as the correlation coefficient between the true and predicted data was 0.376. Therefore, we have shown quantitatively that pupil size can be modeled based on neuronal activity within the visual cortex with a high level of accuracy.
Conclusion and Potential Impact: This experiment demonstrates the feasibility of linear regression for modeling neuronal behavior in the visual system, particularly related to pupil size. This potentially presents another source for information for proper pupil size in patients experiencing a third nerve palsy.

Under-recognition of Leukemic Lung Infiltration in Patients with Leukemia and Acute Respiratory Illness

Ehteshami-Afshar S, Valda-Toro P, Lee S, Avery C, Cohen A, Kahn P, Dela Cruz C, Gautam S

Purpose: Respiratory illness is common in patients with acute leukemia. Infection is thought to be the most common cause, but a number of non-infectious pulmonary complications occur in such patients as well. These include pulmonary edema, alveolar hemorrhage, and leukemic infiltration. Failure to recognize these etiologies may lead to unnecessary evaluation and therapy for presumed infection and/or delays in chemotherapy for treatment candidates and palliative care transition for non-candidates. In this study, we sought to evaluate the etiology of respiratory illness during active

leukemia.
Methods: A retrospective analysis was performed on adult patients admitted to Yale New Haven Hospital from 2013-2018. Inclusion criteria were (i) peripheral blast count >3% (indicating acute leukemia), (ii) performance of bronchoscopy with bronchoalveolar lavage, and (iii) negative microbiological testing or designation of positive findings as nonpathogenic by an independent infectious disease physician. The cause of respiratory illness in included cases was determined by retrospective chart review by three independent clinicians.
Results: A total of 36 cases of non-infectious respiratory illness were identified (mean age of 62 2.1 years). The mean interval from bronchoscopy to the time of death was 15 5 days, and mean maximum peripheral blast percentage was 40.3 5.2%. Underlying hematologic malignancies were acute myeloid leukemia in 80.6% (11 new, 18 relapsed), acute lymphocytic leukemia (5.5%), chronic myeloid leukemia (5.5%), lymphoma (5.5%), and myelodysplastic syndrome (2.7%). Respiratory illness was attributed to leukemic infiltration in 94.4% cases and to alveolar hemorrhage in the remaining 5.6%. All 36 cases received broad spectrum antimicrobials even after having a negative bronchoscopy with an average treatment duration of 19 4.7 days. Patients underwent an average of 18 2.0 microbial cultures (all negative), 4 1.1 diagnostic imaging tests, and were hospitalized for 22 2.8 days. Of 34 cases with presumed leukemic infiltrates, 15 received chemotherapy (treatment candidates) and 18 were eventually transitioned to hospice care (noncandidates). On average, this transition occurred 36 20.2 days after bronchoscopy.
Conclusions: Although leukemic involvement of the lungs is considered rare, our study reveals that it is actually quite common in patients with active leukemia and negative bronchoscopic testing. Failure to recognize this condition leads to extensive infectious evaluations and delays in transitions to palliative care for treatment noncandidates.
Clinical Implications: Leukemic infiltration should be considered early in patients presenting with active leukemia, as this may obviate the need for aggressive infectious workup and treatment, and expedite transitions to hospice.

Pro-Bono Student Consulting: Development of a Medical Student Platform for Improving Community Health and Addressing Healthcare Disparities

Becker T, Giwa L, Rao V, DeLeon G

Introduction: Over a year removed from the onset of the COVID-19 pandemic, the need for innovative solutions to community health problems and healthcare disparities has never been more apparent. We proposed the creation of a student-led, project-based organization for medical students to improve community health and address disparities by utilizing their unique skillsets and previous experiences to provide pro-bono consulting. This outlet would provide real-time application of the concepts and values being taught in our medical school coursework, while also providing unparalleled learning opportunities for the next generation of physician-leaders.
Methods: In March 2021, we compiled a database of community health organizations and non-profits in the Fort Wayne, IN area to complete due diligence in determining the need for a pro-bono student consulting group. Organizations with missions to directly or indirectly improve health outcomes were included. We also created a list of industry contacts in consulting and healthcare disparities to promote the group's internal efforts in leadership development and education. Community and industry interest were determined by response rate.
Results: A total of 27 community organizations were identified with services in direct patient care, food security, disability services and women's health. Eight organizations were selected for initial outreach via email and telephone. Of the initial outreach, the response rate was 62.5% (n=5). Three of the respondents confirmed interest in developing a project at a later date, and the remaining two agreed that a medical student-led pro-bono consulting group would provide much needed services to local community health organizations. Four industry connections were contacted for guidance in identifying resources in consulting and healthcare disparities. Two of the connections were consultants, having worked for PwC and Google. One contact was the chief executive officer of a municipal health and hospital corporation in Indianapolis, IN, and the final contact was a human resources director for Eli Lilly and Company with experience in diversity, equity and inclusion. Industry interest was measured at 100% (n=4), with all contacts either providing guidance in organizational structure or offering to provide educational talks in the future. The meeting with Eli Lilly and Company led to an invitation for the group to present at LillyX, formerly TEDxLilly, in recognition of the group's success in reflecting, evolving and engaging.
Discussion: Student-led organizational development resulted in a pro-bono student consulting platform that community health organizations found beneficial to the point of interest in developing a project after one meeting. Industry interest was also positive, lending credibility to the process of medical student-led initiatives in healthcare. This model can serve as the basis for viewing medical students as a valuable resource in healthcare innovation.

Epilepsy in Pediatric Obstetrics

Bigelow K, Eckrote E, Brent J, Yeagley T

Case: 17 year old female G1P0 with a medical history of seizures treated with Keppra 250 mg BID presented for prenatal care at 17+5wks. She was diagnosed with epilepsy a year ago and reported seizure episodes 2-3 times per month, most recent being during her first trimester. Patient presented to the emergency department at 25+3wks stating she experienced a seizure and cramping and felt decreased

fetal movement. Fetal heart tracing was reassuring for her gestational age. After oral hydration and apple juice, over time she began appreciating the fetal movements again. The patient was monitored until normal fetal movement resumed. Patient denied headache, vision changes, vaginal bleeding and contractions at the time. She was discharged in stable conditions. Of note, the patient has continued on Keppra and not yet delivered.
Discussion: Epilepsy is the second most common neurologic complication in pregnant women, after migraine. Although a majority of women with epilepsy deliver healthy babies, treating obstetric patients with a history of epilepsy is complicated. It is ideal for these women to seek medical care before pregnancy since antiepileptic medications can be teratogenic and maternal seizures can cause temporary fetal hypoxia. Antiepileptic drugs are most dangerous during the first 10 weeks of development. Most women with epilepsy will continue on antiepileptic medication during pregnancy with adjustments to medication and dosage to maximize safety. Some factors that influence delay of prenatal care until after their first trimester include low income, lack of an OB provider, and being from a country other than the United States.
Conclusion: Youth with epilepsy need frequent attention and education on how to manage their medications. It is important to collaborate with neurology in cases like this. It is very possible for mothers with a history of epilepsy to give birth to healthy babies, however, consequences can be severe or even fatal if their care is delayed.

Patient Values Guides Decision-Making in Advanced Breast Cancer

Gambetta V, Hodapp A, Lewis K, Newton E

Case: The patient is a 50 year old female diagnosed in 2012 with Stage IIIA ER+ invasive lobular breast carcinoma. After neoadjuvant chemotherapy, she underwent mastectomy and axillary node dissection, followed by radiation and adjuvant anastrozole. In 2019, she presented with abdominal bloating and was found to have metastases to lungs, liver, and pelvis. Her cancer responded well to 3 doses of eribulin, but she developed neutropenic fever, severe mucositis, and a steep functional decline. Her therapy was then transitioned to fulvestrant and abemaciclib, but she was unable to tolerate the myelosuppression. Treatment was then changed to capecitabine which she is tolerating well with excellent disease control. Conclusion: Invasive lobular carcinoma is the second most common type of breast cancer, occurring in nearly 10% of cases. Without a single standard of care for metastatic ER+ breast cancer, navigating the numerous treatment options can be overwhelming and is best done by incorporating the patient's values and goals.
Clinical Significance: The patient was initially faced with several decisions regarding her treatment at presentation. After exploring her values and goals, a more aggressive adjuvant regimen was selected over a more conservative approach. Despite her outstanding compliance, her disease recurred in multiple organs. Even though she understood her disease could not be cured at this point, she maintained her resilient spirit and made clear she still desired aggressive treatment. Once better disease control was obtained the patient voiced a desire to decrease the side effects and thus capecitabine was recommended. As a strategy to navigate the complex myriad of available treatments, therapy regimens should be guided based on the patient's overall goals. As a result, patient autonomy was prioritized and she has had a good quality of life.

Intraoperative Mannitol Administration During Laparoscopic Donor Nephrectomy and Impact on Long-Term Graft Function

Gryzinski G, Farrow J, Bahler C, Sundaram CP

Introduction: End-stage renal disease frequently results in dialysis, and at best, transplantation. Laparoscopic donor nephrectomy was introduced in 1995 and has been a valuable source of high-quality organs. Improving long-term graft function of recipients through judicious intraoperative medical management remains an essential goal. Infusion of mannitol prior to hilar clamping during donor nephrectomy has been utilized based on its proposed cytoprotective properties - theoretically improving renal perfusion, free-radical scavenging, and diuresis. However, there is a paucity of large, long-term studies evaluating its use. In this study, we aimed to explore the long-term effects of intraoperative mannitol administration on graft function as measured by creatinine.
Methods: A single-center, retrospective analysis of a contemporary cohort of donor nephrectomies was performed. Eighty donors (sample determined using a power of 0.8 to detect a 20% difference in creatinine) were identified and then matched to recipients using Indiana University's Organ Transplant Tracking Record database. Patients were balanced by sex and stratified by intraoperative administration of mannitol (yes vs no). Creatinine was recorded at fixed intervals per routine nephrology follow-up. Statistical analysis was performed using SPSS.
Results: Basic demographics are presented in Table 1. The only significant difference in baseline clinical factors was donor intraoperative diuretic administration, which was more frequently co-administered with mannitol. Creatinine means by time can be seen in Figure 1. Multiple means comparisons were made using ANOVA and did not reveal any differences in creatinine at three years post-transplant ($p > 0.05$).
Conclusion: Mannitol administration did not statistically affect post-transplant creatinine up to the three-year follow-up. On post-hoc analysis, elimination of cases where diuretics were co-administered did not change these results.

Examining the Efficacy of a Virtual Interprofessional Education Intervention Compared to In-Person

Herriott HL, McNulty MA

Effective interprofessional (IP) collaboration has become an essential skill for practitioners in healthcare settings due to a shift towards team-based practice. In order to cultivate interprofessional competencies such as communication, teamwork, and role comprehension, a case-based learning (CBL) intervention targeting the aforementioned skills was incorporated throughout an anatomy course for physician assistant (MPAS), physical therapy (DPT), and occupational therapy (OTD) students. 4th-year medical (MD) students were recruited to facilitate these small group CBL activities in-person in 2019 and virtually in 2020. Data were collected from a clinically-focused role knowledge survey, administered to MD, MPAS, DPT, and OTD students before and after the course, as well as eight focus groups. Following the virtual CBL intervention, a mere 68.57% of students felt the CBLs improved their interprofessional competencies compared to 85.72% when the course was taught in-person. With respect to the pre-/post-role comprehension survey, students in the virtual cohort not only failed to demonstrate a significant decrease in role misidentification (as seen in the in-person CBL cohort, p=0.002), their change in the average rate of misidentified roles (-1.23%) was nearly identical to those observed in the historical control cohort that did not engage in CBLs (-1.19%). These findings suggest that the educational intervention aimed at promoting interprofessional communication was not effective in a virtual setting. Focus group data corroborate these quantitative findings, with many students asserting virtual learning-specific challenges impeded both communication and teamwork. Moving forward post-pandemic, as institutions begin to deliberate on the utility of virtual learning compared to hybrid, or in-person approaches; it is essential for stakeholders to consider the explicit, measurable learning objectives in tandem with the more difficult to quantify professional competencies an educational experience is aimed at promoting. With respect to interprofessional education and collaborative competencies, the results outlined above indicate virtual learning does not facilitate the acquisition of communication, teamwork, or role comprehension skills as well as in-person learning.

Utilization of smoke evacuation in dermatology: A national cross-sectional analysis

Holmes SP, Hooper PB, Que SKT

Background: Despite associated hazards of surgical smoke, there is limited data regarding smoke evacuation practices among dermatologists. Such information is especially relevant at this time as dermatologic procedures often involve exposure to aerosolized particles, which can carry viruses like COVID-19.
Objective: To examine the barriers underlying historically low utilization of smoke protection among dermatologists.
Methods: A survey was sent to dermatologists through the Association of Professors of Dermatology (APD) list-serv and a cross-sectional analysis of responses was performed.
Results: A total of 85 dermatologists responded. Twenty-four (28.2%) reported use of smoke evacuators during > 50% of dermatologic procedures. The odds of using smoke evacuation was 2.8 times higher in dermatologists with 10 or more years of experience (95% CI, 1.1-7.5; p=0.0358). The most commonly reported barriers to smoke evacuation were limited staffing (63.5%) and set-up time (61.2%). Sixty-seven (78.8%) respondents reported that a hands-free evacuator could potentially increase the use of smoke evacuation in their practices.
Limitations: Survey sent on an academic list-serv with relatively small sample size and limited generalizability.
Conclusions: Smoke evacuation remains low among dermatologists despite the risks. Identifying reasons for low utilization and receptiveness to potential solutions is necessary to improve safety practices relating to smoke evacuation.

Patient-reported outcomes and satisfaction associated with the use of a hydrocolloid dressing versus conventional wound care after dermatologic surgeries

Holmes SP, Rivera S, Hooper PB, Que SKT

Purpose: Hydrocolloid dressings have been documented in the literature to be helpful for chronic ulcers, but there is limited research documenting their use for post-surgical wounds after dermatologic procedures. The following study aims to investigate this gap by evaluating patient satisfaction and postoperative outcomes associated with a simplified wound care regimen involving the one-time application of a hydrocolloid dressing as compared to conventional wound care with daily dressing changes.
Design: The study included patients who underwent Mohs or standard surgical excision with linear closure at a tertiary care academic facility from January 2020 to January 2021. The patients selected additionally had a history of excisional surgery with conventional daily dressing changes within the last 3 years. A modified version of the validated Bluebelle Wound Healing Questionnaire was distributed to participants via phone, REDCap email link, and in-person at follow-up clinic visits. Responses were subsequently uploaded and stored in REDCap. Data was analyzed in SPSS using descriptive statistics, frequencies, and paired sample t-tests.
Findings: Data collection is ongoing. To date, 59 patients have participated, with an average age of 66.0±13.8 (range: 32-93) years old. The majority of patients (n=48, 81.4%) completed wound care independently. Dressings remained in place for 6.4±3.1 days after application. As compared to conventional

wound care with daily dressing changes, a one-time application of the hydrocolloid dressing rated higher in terms of comfort, convenience, scar appearance, and simplicity ($p<0.05$). Nearly all participants (n=57, 96.6%) stated if given the choice in the future, they would choose a one-time application of hydrocolloid dressing over conventional wound care. No participants in this study experienced fever, required antibiotics, or were hospitalized.
Summary: Wound care after dermatologic surgery can be tedious and confusing. With daily dressing changes, topical emollient applications, and hard-to-reach surgical sites, conventional wound care regimens have been a source of confusion and frustration for patients. Our study suggests that use of a simplified regimen involving a hydrocolloid dressing can lead to increased comfort, convenience, simplicity, and a subjective improvement in scar appearance

Balancing Student Sex Education Needs with Community Preferences: A Qualitative Study in Rural Indiana

Hoseus S, Meagher CG, James R, Cope-Barnes D, Ott MA

Background and Purpose: Rural youth experience high rates of teen pregnancy. Despite this increased health risk, little data exist on evidence-based sex education programs (EBPs) in rural communities. Using the Exploration, Preparation, Implementation, and Sustainment (EPIS) framework, we describe the challenges and community-derived solutions in implementing an EBP in rural Indiana schools, providing insight on rural EBP implementation.
Methods: As part of a larger federally funded implementation project, an abstinence focused EBP (Making a Difference! and Guiding Good Choices) was taught at middle schools located in twelve counties in rural southern and eastern Indiana. Three community agencies implemented the curriculum over three years. Afterwards, SH and CM conducted interviews of the agency partners (n=13) and of key school stakeholders (n=6). Interviews were conducted via Zoom, audio-recorded, transcribed, field notes written, and all data analyzed using thematic analysis. Codes were developed from the EPIS framework and included outer contexts of communities, inner contexts of schools, prepawwration activities, implementation, and potential sustainability. We asked participants to identify challenges and solutions.
Results: Challenges and solutions were mapped onto the EPIS framework. Outer context challenges included religion, conservative communities, outside agencies, and parenting beliefs. Inner context challenges included lack of teacher and administrator support. Preparational challenges included lack of communication with parents, lack of community outreach, and lack of parent education. Implementational challenges included teaching a 60-minute lesson in 45 minutes and classroom engagement of schoolteachers. Sustainment challenges included teacher discomfort with the topic. Community-derived solutions included building community trust before implementation, providing information to parents, inviting administrators to observe, offering a student question box, and training school staff to implement the program.
Conclusion and Potential Impact: Many challenges emerged during implementation because of perceived lack of preparation. Future implementation of EBPs in rural communities should focus more on aspects of exploration and preparation.

COVID-19 impact on female healthcare workers: a literature review

Howser L, Patel S, Dempsey H, Agarwal N

Background: The increased demand the COVID-19 pandemic has placed on health care workers, along with the desire of female health care workers to work on the front lines, clashes with the societal expectation of women to be the primary caregiver of her family. This project will look at the increased disparities of female healthcare workers during the COVID-19 pandemic. Our goal is to point out these inequalities in the hope of drawing awareness and sparking interest in creating solutions to reduce the impact of the pandemic on the mental health of female health care workers.
Methods: Systematic review of literature published relating to female healthcare workers during the COVID-19 pandemic was completed using PubMed. The following terms were used to complete the search: COVID-19, female, healthcare, physician, SARS-CoV-2.
Results: Women were shown to have more familial responsibilities even prior to COVID-19. In a study by Starmer et al., female physicians reported being primarily responsible for 13 out of the 16 household chores measured in the study. When looking at male vs female healthcare worker depression, anxiety, and insomnia during the COVID-19 pandemic, a study by Pappa et al. showed higher rates of affective symptoms in female healthcare workers. Interestingly, a study by Ing et al. showed only 10% of physician COVID-19 related deaths were of females. Females make up 76% of healthcare workers. However, the majority of healthcare executives are male, making the female voice underrepresented.
Conclusions: Women in healthcare have been affected in different ways than men during the COVID-19 pandemic. Women have had worse mental status likely due to balancing increased stress at work and home. There have been fewer COVID-19 related deaths of female physicians, which could indicate females backing away from front-line exposures to prioritize a familial role. These factors are important to be aware of while COVID-19 continues to impact healthcare workers.

Intraosseous cranial myxoma: a case report and review of literature

Howser L, Ye MJ, Boham S, Fan R, Nelson RF

Introduction: A myxoma is rare benign tumor of mesenchymal origin. In terms of head and neck myxomas, primary tumors are rare and most often arise from the mandible, maxilla, and oral cavity. There is a paucity of data on incidence and treatment of intraosseous occipital myxomas. Case reports have identified occurrences of other intracranial myxomas. In this case report, a 12-year-old boy with a myxoma arising from the occipital bone is presented due to the tumor's rare anatomical location, especially in a pediatric patient.
Case Report: A 12-year-old boy presented to the Emergency Department with left ear pain with tenderness to palpation overlying the left mastoid bone. A computed tomography scan (CT) with contrast at this time showed a 4.8 cm lytic mass centered in the occipital bone bordering the mastoid. The patient underwent biopsy of the suboccipital area mass. Initial pathological workup was inconclusive but thought to be suspicious for low-grade sarcoma. Definitive resection with left occipital craniotomy and gross total resection was performed through a post-auricular incision from the mastoid tip to the occiput. Immunohistochemistry was positive for vimentin and focally positive for actin. The findings were most consistent with an intraosseous myxoma. No postoperative complications, neurological deficits, or evidence of recurrence were apparent on clinical exam at one and three months.
Conclusion: The suboccipital region is a rare location for an intraosseous myxoma to occur. Early diagnosis and treatment are imperative for prognosis due to radical resection being the best chance for nonrecurrence. Even with surgical resection, long-term follow up is needed as high rates of recurrence are documented.

Repetitive Transcranial Magnetic Stimulation as a Probe of Episodic Memory Neurocircuitry in Schizophrenia

Kleyn T, Francis M, Visco A, Hummer T

Background and Hypothesis: People with schizophrenia often experience impairments with episodic memory (EM). Due in part to a lack of understanding regarding the neural mechanisms of EM, there are no effective treatments. Recent research indicates that the precuneus may be associated with EM impairment. Repetitive transcranial magnetic stimulation (rTMS) is a commonly employed intervention for treatment resistant depression, but its potential for investigating other psychiatric disorders such as schizophrenia is unclear. We hypothesize that, compared to sham stimulation, 1 Hz rTMS will decrease precuneus activity and 20 Hz rTMS will increase precuneus activity during an EM task.
Experimental Design: Seven patients with early phase psychosis underwent a baseline fMRI scan during an EM recognition task that required participants to accurately identify which images were previously shown (targets) or not shown (foils). Next, participants had three separate rTMS sessions targeting the precuneus, each one week apart, in a randomized order: inhibitory (1 Hz) rTMS, excitatory (20Hz) rTMS, and sham stimulation. Each rTMS session was immediately followed by fMRI during the EM task.
Results: We currently remain blind to the conditions because the study is ongoing. Participants had relatively lower accuracy during foil trials in one treatment session. During this same session, precuneus activity was relatively stronger to foils than targets, compared to other treatment sessions. These preliminary results suggest that rTMS applied to the precuneus may impact episodic memory and related brain activity in early psychosis .
Conclusion and Potential Impact: Data from this study will help determine whether targeting the precuneus with rTMS impacts functional activation in patients with schizophrenia during EM tasks. Additionally, relationships between EM performance and changes in precuneus activity will be identified. If effective, rTMS may represent a novel treatment for EM deficits in schizophrenia.

Durability of Cementless Primary Total Hip Arthroplasty in Patients Age 75 and Older

Saldivar R, Buller LT, Deckard ER, Ziemba-Davis M, Meneghini RM

Background and Hypothesis: Cementless femoral fixation in total hip arthroplasty (THA) has increased in prevalence worldwide. However, cementless fixation in elderly patients is controversial due to the risk of periprosthetic fracture and/or femoral component loosening. We evaluated the effect of age on implant survivorship in patients ≥75 versus <75 years of age. Intraoperative fracture, mortality, and revision cause also were evaluated.
Project Methods: 532 cementless THAs performed with consistent surgical, perioperative, and rehabilitation protocols by one surgeon between 2011 and 2018 were retrospectively reviewed. Patients with less than two years follow-up were excluded. 84 patients were ≥75 and 448 were <75 years of age. Average follow-up was 44±12 months (p=0.965). Revision rate, intraoperative fracture, 90-day mortality, and overall mortality were compared with p<0.05 considered statistically significant.
Results: In the ≥75 group there were more females (70.2% vs. 59.2%, p=0.067), more ASA-PS class 3-4 (76.2% vs. 46.2%, p<0.001), and lower BMI (28.6±5.7 vs. 31.3±6.9, p<0.001). Patients <75 had more hip dysplasia (p=0.023) and patients ≥75 had more kidney disease (p<0.001). Revision rates between the ≥75 and <75 groups (1.2%, 1.8%) were not different (p=1.000). Moreover, there was no difference in femoral component revision (<75 = 62.5%, ≥75 = 0.0%, p=0.444) with all femoral revisions due to infection not fracture or loosening. Intraoperative fracture (<75 = 0.9%, ≥75 = 1.2%, p=0.578), 90-day-mortality (one in

the younger group, none in the older group, p=1.000), overall mortality (10 in the younger, 4 in the older group, p=0.253), and mean months between surgery and death (p=0.694) did not differ in younger and older patients.
Conclusion and Potential Impact: Older patients had comparable implant survivorship compared to younger patients using cementless femoral fixation. In addition, there were no differences in risk for mortality or intraoperative fracture. These findings provide evidence for the safety and durability of cementless THA in elderly patients ≥75 years of age.

The Ripple Effect II - Analysis of the Cascade of Events Associated with CVC and PICC Line Loss and the Impact on Nurse Workflow, Patient Outcomes, and Resource Utilization

Schenk J, Will L, Saiko-Blair M, Graves M

Little research has been done on the costs of CVC or PICC line dislodgement to patients, staff, and the hospital. The primary objective of this study was to characterize and evaluate all the costs of a CVC or PICC line dislodgement in a general medical hospital. A questionnaire was utilized to determine patient demographics, causes of dislodgement, disruption of care, expense of dislodgement cleanup, and the expense of establishing a replacement IV, PICC line, or CVC for 7 sequential patients over a three month period. The average cost of dislodgement was found to be $216.14, and the average time without an IV was 156 minutes. The most common cause of dislodgement, 50% of total, was the result of a cognitive issue. Reducing catheter dislodgement will favorably impact the existing cost burden on the US healthcare system.

Invasive stratified mucin producing carcinoma (i-SMILE): A newer cervical adenocarcinoma variant with potentially aggressive behavior

Clark HE, Schenk JS, Muldoon JL, Segura SE

Case Description: Patient is a 32-year-old G_3P_{3003} with history significant for two prior abnormal Papanicolaou smear results of squamous cells of undetermined significance (ASCUS)/HPV+ (unknown p16/18) and atypical squamous cells that cannot exclude high grade squamous intraepithelial lesion (ASC-H)/HPV+ (p16+). Colposcopy revealed low grade squamous intraepithelial lesion and endocervical adenocarcinoma in situ (AIS) but no evidence of invasive carcinoma. A cold knife cone cervical biopsy demonstrated adenocarcinoma, invasive stratified mucin producing carcinoma (i-SMILE) variant in the background of stratified mucin-producing intraepithelial lesion (SMILE) and AIS. Conclusion: The patient subsequently underwent a total abdominal radical hysterectomy with bilateral salpingectomy, ovarian transposition and pelvic lymphadenectomy. Endocervix was positive for invasive adenocarcinoma with negative margins. Lymphovascular invasion was not identified.
Clinical Significance: SMILE is characterized by a combination of immature, stratified epithelial cells with intracytoplasmic mucin throughout all layers. The immunophenotype of SMILE demonstrates p16 expression, which correlates with high-risk Human Papillomavirus (HR-HPV) intraepithelial lesions. Its invasive counterpart, i-SMILE, can show a variety of architectural and cytologic patterns, which can cause a potential misdiagnosis, with cases been previously diagnosed as adenosquamous carcinoma, squamous cell carcinoma or other type of cervical adenocarcinoma. It is important to recognize the morphologic spectrum of i-SMILE, as these are potentially aggressive tumors, they are diagnosed at higher stages, and more frequently demonstrate destructive stromal invasion when compared with usual type endocervical adenocarcinoma. Clinicians should also be made aware of these newer histopathological diagnoses to be able to appropriately interpret their reports and determine treatment plans for their patients.

"My birth control is making me depressed," balancing potential mood effects of hormonal contraception with a patient's contraceptive goals

Steele E, Sandler R, Hadley E

Case: A 21-year-old woman with a history of polycystic ovarian syndrome (PCOS), dyspareunia, and bipolar disorder presented to the clinic wanting to switch contraception from the Nexplanon implant to a combined oral contraceptive (COC). At age 18, the patient was diagnosed with major depressive disorder (MDD). Shortly following her diagnosis, the patient was given the Nexplanon implant for birth control. The patient reports that soon after getting the implant, her psychiatric symptoms worsened and her diagnosis was changed from MDD to bipolar disorder. She hopes that switching contraceptive methods will alleviate her mood symptoms.
Conclusion: It is common for patients to have low compliance with contraceptives due to perceived negative mood effects. Data suggests that the type of progestin component may play a role. In response to the patient's concerns, she was switched to Loryna, a combined oral contraception with drospirenone, a progestin with known antiandrogenic effects. Due to these effects, it is less likely to contribute to adverse mood symptoms while also improving symptoms of PCOS. By honoring the patient's experience, the physician was able to adjust the contraceptive method and increase the likelihood of patient satisfaction and compliance.
Clinical Significance: While many studies have demonstrated beneficial mood effects of COCs, a significant number of patients who change or cease their contraceptive method

cite mood and sexual dysfunction as their primary reason. Variation between individuals may be due to differences in prenatal receptor organization. Assessment and management of underlying psychiatric symptoms is also important. To improve compliance with COCs and foster collaborative physician-patient relationships, it is critical for physicians to inquire about the patient's goals and engage in shared decision making to choose a contraceptive that is right for each individual.

Retrospective Chart Review Comparing CKD COVID-19 Positive Patient Outcomes to non-CKD Patient Outcomes

Eckert N, Sankari S, Allen K, Hui SL, Mendonca E

Background/Objective: Since January 2020, there have been over 3 million individuals infected with the coronavirus in the United States, quickly spreading across at least 171 countries. The severity and morbidity of patients with COVID-19 are significantly increased when comorbidities, such as Chronic Kidney Disease (CKD), are present. Because the main target of SARS-CoV-2 is ACE2, patients with CKD may be a more vulnerable population. The goal of this study was to determine if COVID-19 positive patients with CKD had increased mortality, inpatient admission, and ED visitation rates compared to those without CKD.
Methods: This retrospective chart review includes patients from over 100 separate healthcare entities who were diagnosed with COVID-19 between January 1, 2020 and July 13, 2020 and are over the age of 18. The subjects were first separated into those diagnosed with CKD and those without, basic descriptive calculations were computed, and a Chi Square test was used to analyze outcomes.
Results: The CKD COVID-19 positive population was compromised of 47.5% men and 52.5% women while the non-CKD control group was made up of 45.4% men, 54.1% women, and 0.5% other. The median Charlson index for the CKD and non-CKD population was 4 and 1, respectively. The interest and control groups were further divided into subpopulations by age and race and analyzed accordingly. Chi square tests demonstrated that there is a statistically significant difference ($p<0.05$) in all clinical outcomes tested of CKD patients diagnosed with COVID-19 compared to non-CKD patients. The CKD population had increased mortality, inpatient admission, and ED visitation rates when compared.
Discussion: This study demonstrates that comorbidities, more specifically CKD, may be associated with a higher severity of COVID-19 than those without. Future studies are needed to explore the relationship more extensively, analyze other outcomes, and manage confounding variables.

Effects of Behavioral Health Problems on ED Recidivism and Utilization

Dalal A, O'Reilly L, Peterson K, D'Onofrio B, Musey P

Background: Although it is known that mental health disorders are associated with higher rates of emergency department (ED) utilization and poorer quality of life, universal mental health screening is not standard in many EDs. Prior work has shown that up to 45% of ED patients have undiagnosed or comorbid psychiatric disorders, which remain undiagnosed after discharge. It is possible that early identification of these mental health concerns and provision of appropriate resources to these patients would reduce strain on emergency services and increase their access to high value care. This study seeks to assess the prevalence of anxiety and depression in a broad sample of ED patients, and its effects on ED utilization and recidivism.
Methods: This was an observational cohort study of adult patients presenting without psychiatric complaint to the IU Health Methodist Emergency Department between May 2019 to March 2020. Eligible patients were approached to complete a self-administered screening for symptoms of anxiety and depression using the validated Generalized Anxiety Disorder 7 item scale (GAD-7) and the Patient Health Questionnaire 8 item scale (PHQ-8) respectively via tablet computer. Among other data collected was the number of ED visits in the 12 months before and 30 days after enrollment. Patients who scored ≥10, the validated cutoff for at least moderate symptoms, on either the GAD-7 or PHQ-8 were categorized as mental health positive (MH+) versus all others without significant mental health symptoms (MH-) and mean visits in the 12 months before and 30 days after enrollment were analyzed via two sample t-tests.
Results: Of the 1854 patients who were approached, 818 patients were ultimately enrolled with an average age of 43.8 (SD ± 16.3). Two hundred forty-one patients (29%) were MH+ with 66% of these being female, 54% white, and 37% black. Among the MH population (577 patients), 60% were female, 51% white, and 41% black. MH+ patients had a greater average number of ED visits in the 12 months prior to study enrollment (3.2 visits versus 1.67 visits for MH- patients, $p<0.001$). There was no statistical difference in average number of visits in the 30 days post enrollment (MH+ = 0.4 vs MH- 0.5, $p=0.68$).
Conclusion: Clinically significant symptoms of anxiety and depression were associated with significantly higher rates of ED utilization in the 12 months prior to enrollment. The findings of this study contribute to the existing body of evidence that individuals with behavioral health problems have higher rates of ED utilization and provide incentive to institute more universal screening protocols to identify and refer these patients to the appropriate resources.

Three Uncommon Associations with Acute Compartment Syndrome Occur Simultaneously in One Case

Clodfelter K, Gaby A, Jones J, Hartman J

Case Description: Patient was a 48-year-old female, non-restrained passenger in a side-by-side ATV accident traveling between 10-15mph. The vehicle rolled toward her side and she was ejected from the vehicle. The vehicle ultimately ended up on her right leg. Shortly after, she attempted to stand but felt that her leg was broken. En route to the hospital, the patient noted great pain and a "pins and needles" sensation over the lower leg. In the ED, the patient described decreased right leg pain and inability to sense light touch with preserved motor function. Workup consisted of a negative CT of head, cervical spine, and facial bones. X-rays demonstrated distal fibular and posterior malleolar fractures. Due to displaying signs of acute compartment syndrome including pallor, poikilothermia, and paresthesia, the patient underwent a 4-compartment fasciotomy of the right lower leg the same day per a general surgeon. The procedure was well-tolerated, and she required 4 days to control pain, have wound vacuums placed, and undergo physical therapy to prepare for discharge home.
Conclusions: This case describes the progression, diagnostic work-up, and treatment of acute compartment syndrome. Presence of distal fibular and posterior malleolar fractures accompanied by pallor, poikilothermia, and paresthesia led to diagnosis of acute compartment syndrome. Patient was treated the same day via 4-compartment fasciotomy of the right lower leg.
Significance: Acute compartment syndrome occurs less often with distal lower leg bone fractures than with proximal lower leg bone fractures. Of all fractures associated with acute compartment syndrome, fibular fractures contribute to a minor percentage of cases. When looking at the incidence of traumatic acute compartment syndrome, it is reported to occur ten times more likely in males than females. This case provides a learning opportunity to study three associations less frequently reported in acute compartment syndrome.

Connecting Faith and Health: Improving Health Outcomes Through Congregant Networks

Campbell M, Christenson J, Craig D

Background and Hypothesis: People living in areas of high social vulnerability face health disparities in part due to disconnection. Health institutions recognize the importance of treating whole persons but are disconnected from local knowledge of community health assets and social and cultural barriers. People in health-challenged neighborhoods may experience disconnection and distrust in seeking the many resources and services needed for good health. Congregations are longstanding anchor institutions in marginalized communities. They build trusted relationships among members through shared values and care for wellness. Sometimes they extend these connections through on-the-ground service to neighboring communities. We hypothesize that a network of congregations can build trusted connections and share local knowledge and cultural competence to improve health outcomes and holistic wellness in vulnerable neighborhoods.
Methods: Community-engaged participatory research requires reciprocity in mapping assets, identifying priorities, narrating shared values, designing projects and messaging results. We developed mixed-methods tools to ensure community expertise drives an iterative research process. Methods include: an initial health and wellness survey, follow-up wellness interviews to collect stories and assets, an online learning community for 14 congregations with monthly focus groups, and visual maps of health data and wellness assets.
Results: While the study is ongoing, preliminary survey data demonstrates that congregations have local knowledge of issues affecting health and wellness among their congregants and the surrounding neighborhood. Their preexisting support for health and wellness through community outreach programs indicates building on their current network could expand their reach and improve health and wellness in vulnerable neighborhoods.
Conclusion and Potential Impact: Successful community engaged research prioritizes iterative methods that allow community participants to use their voice and tell their stories. Congregations' practice of shared values and knowledge of lived experience can forge connections for greater resilience and health supports in socially vulnerable communities.

Treatment of KRAS-Mutated Colorectal Lung Metastasis Complicated by Insurance Coverage

Avery C, Vaughan J, Wickstrom M

Case: A 61-year-old female with a diagnosis of stage 3, KRAS-mutated sigmoid colon adenocarcinoma with lung metastasis presented to her family medicine physician. The patient has also been diagnosed with emphysematous COPD, essential primary hypertension, iron deficiency and vitamin B12 deficiency anemia, cholelithiasis without obstruction, paroxysmal atrial fibrillation, peripheral neuropathy, an anal ulcer, and stricture of the intestine. The patient endorses constant pain especially on movement of her bowels. Although the patient is trying to cease her tobacco use via nicotine patches covered by her insurance, she is an active smoker. Celecoxib was prescribed because NSAIDs have shown some efficacy in prolonged mortality in KRAS-mutated oncology.
Conclusion: The patient failed normal chemotherapy treatment and is on a second-line chemotherapy regimen including celecoxib. Her insurance will not cover celecoxib, deeming it "experimental protocol." As a result, the patient is paying out of pocket and utilizing GoodRx.

Clinical Significance: Due to failed treatments and coverage denial for recommended treatment, this patient is a prime example of healthcare coverage complicating health access. Innovations in treatment options have led to decreased mortality in colorectal cancer over the last ten years, yet this patient's care is not fully covered due to being considered experimental. While navigating lack of insurance approval, this patient continues to work nights in a physically-demanding occupation, in part so that she can afford her current treatment regimen. While this patient has been able to afford her medication despite insurance denial, other patients may not be able to afford treatments and therefore may be non-adherent with their chemotherapy. This case explores potential cost-related medication non-adherence along with the impact on cancer treatment and mortality.

A Case of Aceruloplasminemia Which Was Not Wilson Disease

Williams CJ, Clemens JC, Wu J, Zimmerman MK

Case: A 58-year-old woman presented with 5+ years of fatigue and joint pain as well as recent short term memory concerns. On initial evaluation she was found to have mild anemia with elevated iron and persistently elevated ferritin as high as 2100 ng/ml. An unrelated cardiac scan had the incidental finding of hepatic iron accumulation. No fibrosis was noted on MRI. Liver biopsy was significant for 3-4+ hemochromatosis with sinusoidal dilation and congestion. Labs showed aceruloplasminemia, low urine copper, and low serum copper. Eye exam was negative for Kayser Fleischer rings but did show retinal iron deposits and early macular degeneration not supporting Wilson disease. Later genetic testing for CP (ceruloplasmin) gene showed heterozygosity for sequence variant c.2342A>C, predicted to cause amino acid substitution p.Lys781Thr.
Conclusion: MRI revealed abnormal signal in portions of basal ganglia and cerebellum consistent with iron accumulation. She was recently switched from deferasirox to scheduled phlebotomy due to medication side effects.
Significance: Our patient had a complex path to diagnosis given that low ceruloplasmin is commonly associated with Wilson disease. However, ceruloplasmin is also a key component in regulating ferric iron binding to transferrin and maintaining copper and iron homeostasis. Clinical evidence of anemia, ophthalmologic findings, and subjective cognitive dysfunction combined with histology and genetic results contributed to accurate characterization of aceruloplasminemia related hemochromatosis rather than Wilson disease. Genetic analysis revealed CP gene c.2342A>C (p.Lys781Thr), a novel mutation not reported elsewhere to our knowledge. Given her heterozygous status for the mutation, further investigation is needed. More importantly for our patient, recognition and treatment at this stage could reduce morbidity from neurodegeneration, pancreatic, and hepatic disease.

Avascular Necrosis of the Hip with Truvada

Wu J, Henry A

Background and Introduction: Tenofovir disoproxil fumarate (Truvada) is a common HIV pre-exposure prophylaxis regimen. Rare side effects such as renal toxicity and bone mineral loss have been reported, but the relationship between Truvada and avascular necrosis (AVN) has not been well reported. The patient reported in this case study has no additional risk factor or underlying conditions that predisposes him to AVN of the hip aside from Truvada use.
Case presentation:A 37-year-old homosexual male who is HIV negative is in a monogamous relationship with a HIV positive partner with undetectable viral load. The patient is taking Truvada prophylaxis with a goal of decreasing his HIV transmission risk. He began taking Truvada in Jan 2015 and was without complications until Apr 2018 when he presented with left hip/quadricep pain initially diagnosed with IT band syndrome. He failed to improve with multiple courses of physical therapy and pain has been recurrent. He received X-rays of the pelvis, bilateral hips, and lumbar spine with 4 views in Jun 2019.
Results were significant for AVN of the left hip. He had no other comorbidities and began taking NSAIDs for pain control. His Truvada was discontinued Jun 2019 and he began Descovy (Tenofovir alafenamide fumarate) but his routine care visit/imaging in Aug 2020 shows worsening AVN and symptomatic pain. Physical exam also showed significant atrophy of left lower extremity muscle groups and antalgic gait.
Conclusion: Truvada has been associated with AVN in patients without previous health risks for decreased bone health/density. Past research has identified improved bone mineral density with discontinuing Truvada and beginning Descovy. However, this patient failed to improve with Descovy and continues to have worsening AVN, perhaps suggesting AVN is not associated with bone mineral loss but possibly other occult reasons.

Gynecologic Malignancy: Consideration for Pelvic Exenteration

Mishra A, Villager N, Ivaturi S, Mueller M

Case Description: A 44-year-old female patient with metastatic vulvar squamous cell carcinoma (SCC) was diagnosed after a 1-year history of a vulvar lesion, first treated with radiation and radical vulvectomy. After vulvectomy, she had a chronic wound that progressively enlarged, exposing her pubic ramus. Biopsies showed recurrent SCC and osteomyelitis of the pubic ramus. Pain associated with the wound severely limited her mobility and ability to sit. A tumor board decided to proceed with total pelvic exenteration 21 months after initial diagnosis of SCC to try to improve quality of life, including removal of the uterus, right fallopian

tube and ovary, bladder, distal ureters, vagina, rectum, pubic symphysis, and pubic rami. Perineal reconstruction was completed with an anterior thigh flap.
Conclusions: Pelvic exenteration (PE) may be offered as a final curative or palliative option for recurrent gynecologic malignancies. Studies show PE may provide symptomatic relief, particularly for patients with significant pain. However, PE has also been shown to increase GI and GU comorbidities and physical and emotional dysfunction. Greatest decreases in quality of life (QOL) occur in the months immediately following PE. While some studies suggest QOL returns to pre-PE baseline around 1 year post-op, others suggest prolonged psychosocial and emotional repercussions of PE, particularly in elderly patients.
Clinical Significance: Pelvic exenteration is a complex operation with a high rate of complications and morbidity; however, it can be the final curative or palliative option for persistent gynecologic malignancies. Factors to consider pre-operatively include estimated quality of life, physical functioning, and emotional repercussions. It is the responsibility of the physician to make all potential outcomes known to the patient. Psychosocial support should be made available, especially within the first few months post-op, which when the patient is likely to experience the greatest decrease in QOL.

Pediatric Epilepsy: A Careful Examination for Lennox-Gastaut Syndrome Diagnosis

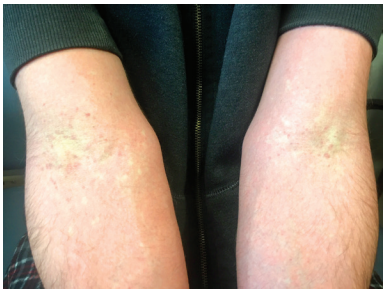
Mishra A, Olson S, Holmes S, Hochstetler A, Peterson R

Case Description: A 2-year-old female patient who initially presented at 2-months-old with a Brief Resolved Unexplained Event (BRUE) that was attributed to reflux and Sandifer syndrome re-presented at 3-months-old with another BRUE that was more concerning for a seizure. She was placed on a prolonged video-EEG monitor, which demonstrated abnormal findings consistent with partial or secondarily generalized seizure disorder. She was soon thereafter diagnosed with Type 1 Lissencephaly via a head CT. A sequencing/duplication deletion test for the LIS1 gene was sent out, which indicated a deletion of the entire LIS1 gene on one copy of Chromosome 17, confirming the diagnosis of Type 1 Lissencephaly. However, the patient was subsequently diagnosed with Lennox Gastaut Syndrome (LGS), a disease that manifests as a severe form of epilepsy with a peak age of clinical presentation between 3 and 5 years. LGS is classically diagnosed by the triad of multiple seizure types, cognitive impairment, and slow spike and wave pattern seen on EEG.
Conclusion: There are many different possibilities that are included on the differential for an infant or young child with a seizure or seizure-like episode. Leading the list would be Sandifer syndrome, febrile seizures, breath holding spells, West syndrome, EMAS, and LGS. Differentiation from the initial presentation can be difficult, especially if an episode was not witnessed in the hospital and was only qualified by parent report. There is potential for additional diagnostics and interventions upon these initial presentations to result in earlier diagnosis of LGS.
Clinical Significance: Although Lennox-Gastaut Syndrome is diagnosed by a classic triad, these symptoms may present asynchronously and mimic other disorders in the early stages of clinical presentation, adding to the challenge of its diagnosis. Helpful characteristics to look at when distinguishing between differentials are age of onset, seizure type, and EEG pattern. Upwards of 65% of those diagnosed with Lissencephaly ultimately result in an LGS diagnosis. Head CTs of infants presenting with seizure-like episodes help to rule-in or rule-out Lissencephaly, and early detection could aid in earlier diagnosis and treatment of LGS.

Child with an Atypical Diffuse Red Rash

Mohammed A, Rahnama-Moghadam S

Case Presentation: A 15-year-old boy presented to the dermatology clinic with a red, diffuse papular rash on his chest, face, arms, and legs along with fever, photophobia, pulsating headaches, nuchal rigidity, malaise, and myalgias in the upper back and shoulders. Suspected scarlet fever syndrome prompted treatment with clindamycin at the emergency department, without improvement. At the tongue, there was a white pseudomembranous exudate that was easily wiped away along with enlarged fungiform papilla and circumoral pallor (Figure 1). A linear array of petechiae were found at the antecubital fossa, dull rather than bright red and analogous to Pastia's lines (Figure 2).



Diagnosis: Mycoplasma pneumoniae. Anti-streptolysin antibodies (ASO) checked for scarlet fever were normal. However, testing was found positive for Mycoplasma pneumonia IgM. Doxycycline 100mg bid was prescribed for a 7 day course. Within 48 hours, the patient's exanthema, enanthem, and constitutional symptoms resolved.
While scarlatiniform mycoplasma infections have been described in textbooks, there are no reports in the primary literature. This varied morphology may result from the molecular mimicry involved in mucocutaneous diseases associated with Mycoplasma. Exposure to M. pneumoniae is theorized to result in the development of autoantibodies against mycoplasma p1-adhesion molecules, which share extensive sequence homology to mucosal keratinocyte antigens.

Drivers and Barriers to the Use of Health Information Exchange Amongst Clinicians in the Emergency Department

Richter B, Dixon B

Background: Health Information Exchange (HIE) describes the exchange of medical data between various health care organizations. Though research is limited, widespread use of HIE may improve patient outcomes while improving efficiency and thus lowering health care costs for patients. The paucity of existing research necessitates further study into the effects of HIE use in the clinical setting. The Indiana Network for Patient Care (INPC) is one of the most comprehensive HIE networks in the country, and provides an ideal environment for conducting research regarding factors that influence HIE use.
Methods:A group of 20 clinicians from the Emergency Department were chosen to answer a set of questions regarding their HIE use. This group included physicians, nurse practitioners, physician assistants, and registered nurses from various health care organizations across the state of Indiana. Interview questions were centered around four main themes: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Interviews were recorded and transcribed, then subject to qualitative analysis using NVivo software.
Results: The Single Sign-On and EHR Button were the most commonly discussed features in terms of facilitating HIE use. Providers used HIE most often when the patient reported previous admission at a different hospital, or when the patient was incapacitated and could not provide information. Although clinicians had unanimous social support for using HIE, inadequate training regarding HIE was apparent, and served as the most common barrier to its use.
Conclusion/Impact:The implementation of Single Sign-On and access to the INPC via a button integrated into the user's EHR are critical for widespread use of HIE, while lack of physician training serves as a major barrier to its use. Implementing SSO and EHR button features while improving HIE training may spurn additional use of HIE and thus lower costs for both hospitals and patients.

Identifying spondyloarthritis in patients with inflammatory bowel disease

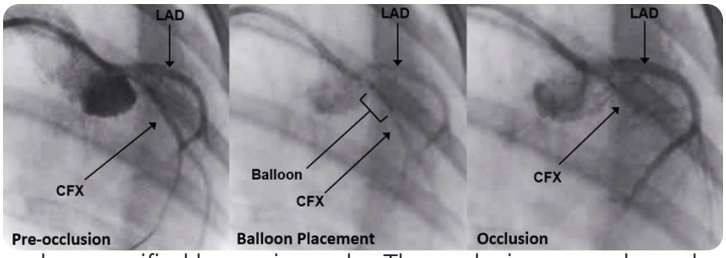
Burns C, Jan R, Flynn J, Rubin D

Background/Objective: Spondyloarthritis (SpA) has been posited to be the most common extra-intestinal manifestation of inflammatory bowel disease (IBD) with a prevalence between 17 to 39%. Axial SpA refers to a syndrome of inflammatory back pain associated with radiographic or magnetic resonance imaging abnormalities. Peripheral SpA can include dactylitis, enthesitis or oligo-arthritis. Given the link between IBD and SpA, establishing a uniform way to identify these patients could markedly decrease the historically long time to SpA diagnosis. The goals of this study are to validate the ability of the Toronto Axial Spondyloarthritis Questionnaire to identify patients with rheumatologic symptoms in the context of IBD, to re-evaluate the prevalence of spondyloarthritis in this population, and create a database identifying patients with both IBD and SpA.
Methods: Patients were selected based on the following criteria: diagnosis of IBD, upcoming appointment with their gastroenterologist, prior consent in the Genesys database, and access to an operational MyChart account. Patients were asked to complete the online survey modified from the Toronto Axial Spondyloarthritis Questionnaire. Positive patient responses will be analyzed in a follow-up visit with a rheumatologist to investigate the patients' symptoms.
Results: At present, 64 responses were collected. Forty three patients had a diagnosis of Crohn's disease, 19 with ulcerative colitis and 2 with unclassified colitis. From the total responses, 20 patients (31%) experienced back pain for a duration of 3 months or longer with 13 having back pain that improved with physical activity. Five patients (7%) had a prior diagnosis of ankylosing spondylitis. Thirty five patients (54%) have had pain and swelling of a joint unrelated to injury. Twenty patients (31%) experienced pain and swelling of an entire finger or toe unrelated to injury. 18 patients (28%) experienced heel pain unrelated to injury.
Conclusion/Potential Impact: Major extra gastrointestinal manifestations of IBD include axial or peripheral spondyloarthritis which can lead to disabling back pain and/ or joint disease. Using the modified Toronto Axial Spondyloarthritis Questionnaire, gastroenterologists could improve identification of concerning joint symptoms, leading to increased referral to rheumatologists and potential changes in treatment plans. The creation of a separate database for this population would allow further investigations into successful treatment.

Ossabaw swine with an impaired function AMP kinase mutation exhibit no preconditioning to myocardial ischemia

Arnold C, Lehr T, Strobel J, Byrd J, Alloosh M, and Sturek M

Background: Myocardial ischemia activates a major metabolic regulator, AMP kinase (AMPK), which affects the electrocardiogram (ECG). Preconditioning is the phenomenon whereby brief ischemic episodes render the heart more resistant to subsequent ischemic injury. The increase in time to reach adverse ECG criteria upon consecutive episodes of coronary occlusion-induced ischemia is a measure of preconditioning in humans. We hypothesized that AMPK mutants will not exhibit preconditioning in contrast to the wild-type swine.
Methods: Ossabaw miniature swine with a spontaneous point mutation Valine199→Isoleucine in the AMPKγ3 subunit were compared to wild-type swine with the Valine199. Balloon occlusion of the circumflex artery induced ischemia



and was verified by angiography. The occlusion was released once any of several ECG criteria were met: ST elevation of 5 mm, QRS widening greater than 50%, 1 premature ventricular contraction, or reaching the occlusion time limit of 15 minutes. A recovery period allowed ST elevation to return to the isoelectric point before beginning the next occlusion.
Results: Young AMPK mutants (3.1 ± 0.5 years, N=3) showed no increase in time to ECG ischemic criteria for 3 consecutive occlusions (mean = 4.3, 3.8, 4.3 minutes). In contrast, young wild-type swine withstood consecutive occlusions for 4.4, 8.8, and 15 minutes, thereby showing preconditioning. One aged (9 years) wild-type pig showed tolerance to ischemia by surpassing the 15-minute time limit without reaching ECG criteria while one aged (9 years) AMPK mutant tolerated ischemia even less than the young mutants. The oldest wild-type pig (14 years) failed to precondition.
Conclusion: Our data support the hypothesis that preconditioning to myocardial ischemia occurs in young wild-type, but not AMPK mutant pigs. Aging further decreased ischemic tolerance of AMPK mutants and impaired preconditioning in wild-type pigs. Future studies are needed to clarify the age-dependence of ischemic preconditioning and tolerance in the Ossabaw swine model.

No Strings: A Case of Malpositioned IUD

Junod C, Layman K, Kinney K, Wright M, Sides CC

Case: A 26-year-old G1P1 female presented to the OB/GYN clinic for a 5-week postpartum visit. The patient desired contraception, so using shared decision making the patient and provider proceeded with the levonorgestrel-releasing intrauterine device, Mirena.
Four weeks later, the patient returned for a follow-up visit. A speculum exam was performed, and the IUD strings were not visualized. A transvaginal ultrasound was done which did not show an IUD in the uterus. An abdominal x-ray revealed the IUD in the right lower quadrant. Informed consent was obtained, and the patient was taken to the OR for laparoscopic removal of the malpositioned IUD. The IUD was visualized on top of the omentum at the midline and was successfully grasped and removed. The uterus was inspected which revealed a healed punctate area posterior to the cervix which is presumably where the IUD perforated the uterus.
Clinical Significance: In the U.S., there are approximately 61 million women of reproductive age with 70% of these women not intending to become pregnant.3 IUDs have increased in utilization due to their low failure rate of 0.1-0.4%.2 An advantage of IUD contraception is convenience as the patient does not need to adhere to a regiment as other birth control require. Like with most medical interventions, there are risks and complications with IUDs. Uterine perforation is a rare complication (<1.0%), however some studies suggest there is higher risk for perforation in postpartum and breastfeeding women, both of which apply to the case presented.4
Conclusion: Intrauterine devices are a highly effective and safe form of contraception; however, providers should be aware of potential complications.

Physical Activity Can Enhance Treatment for Substance Use Disorder: A Systematic Review

Blake E, Sawyer A, Savaiano D

Background/Objective: Substance use disorder is a significant yet treatable mental health disorder affecting approximately 20.3 million Americans in 2018. Its continued prevalence indicates the need for additional approaches to complement existing therapies. Physical activity is one potential nontraditional therapy that has been utilized. A qualitative systematic review was conducted to investigate the effects physical activity as a therapy adjunct for non-alcohol and non-tobacco substance use disorder treatment, evaluating effects on substance use and craving levels.
Methods: Using PRISMA guidelines, English language papers in CINAHL, PubMed, Embase, and APA PsycArticles were searched with no date restrictions. In total, 387 abstracts were screened, of which 342 were excluded because they investigated irrelevant outcomes, analyzed solely alcohol or tobacco use disorder, were not primary research, or were duplicates. The remaining 45 citations were reviewed independently by two authors, and 17 were included in the final review. The included studies were graded using a quality criteria checklist based on the quality constructs and domains for research studies reported by the Agency for Healthcare Research and Quality.
Results: Of the 17 included studies, 9 reported favorable outcomes of physical activity on reducing substance use. Four of these articles were of positive quality, and 5 were of neutral quality. Additionally, 4 studies reported favorable outcomes of physical activity on reducing craving levels. All 4 of these studies were of neutral quality. No studies reported unfavorable outcomes.
Conclusion: The findings indicate that exercise may help to reduce substance use and cravings in those undergoing treatment for substance use disorder, but research on which forms of exercise improve treatment for specific substances is needed.
Impact and Implications: This study helps to clarify that further research is needed to optimize the effects of exercise as an adjunct treatment for substance use disorder.

The Effect of Biofilm-Forming Bacteria on Inflammasome Activity

Williams GL, Santra S, Roy R

Background and Hypothesis: Over 75% of chronic wounds have biofilm infection. Biofilm infection derails the overall process of wound healing. Biofilm bacteria have developed strategies to subvert macrophage inflammatory response. The underlying mechanisms of such subversion are currently unknown. Inflammasomes are multiprotein, intracellular complexes that contain caspase-1. Caspase-1 is responsible for cleavage and activation of cytokines IL-1β, a major pro-inflammatory cytokine in chronic wounds. We hypothesized that biofilm bacteria subvert macrophage inflammatory response by attenuating caspase-1 activity and thereby reducing IL-1β. The primary objective of the study was to determine Caspase-1 activity and IL-1β production by blood monocytes derived from patient blood samples exposed to biofilm infection ex vivo and clinical wound macrophages.
Methods: Wound macrophages were isolated from chronic patients seen at Indiana University Health Comprehensive Wound Center (CWC). Blood monocyte derived macrophages (BMDMs) were exposed to conditioning media from isogenic mutant strains SA300ΔsarA or SA300ΔrexB (derived from Staphylococcus aureus USA300LAC) as hypo- and hyper-biofilm forming mutants. Wound macrophages were isolated from wound fluid with known bacterial content. The IL-β release and caspase-1 activity from macrophages were determined using ELISA, PCR, and a colorimetric assay.
Results: Both RT-PCR and ELISA independently exhibited a significant reduction in IL-1β production in macrophages exposed to conditioned media from hyper-biofilm forming SA300ΔrexB as compared to hypo-biofilm forming SA300ΔsarA mutant.
The Caspase-1 activity was significantly reduced in the macrophages challenged with hyper-biofilm forming bacteria as compared to hypo-biofilm forming mutant.
Conclusion and Potential Impact: Biofilm forming bacteria leads to an attenuation in production of IL-1β from macrophages indicating a subversion of inflammatory response. The caspase-1 activity data exhibited a significant role of caspase-1 in biofilm mediated subversion of the inflammatory response indicating a reduction in inflammasome activity. A clear understanding of the mechanisms of biofilm mediated suppression of host response will help improve therapeutic strategies against wound biofilm infection.

Osteoarthritic Severity in Unresurfaced Patellae Does Not Adversely Affect PROMS in Contemporary TKA

Schmidt G, Farooq H, Deckard ER, Meneghini RM

Background: Selective patella resurfacing during total knee arthroplasty (TKA) is experiencing a resurgence as the value of universally resurfacing the patella with modern patella-friendly implants in contemporary TKA is questioned. However, as we define criteria for selective patella resurfacing, the degree of osteoarthritis (OA) acceptable to leave a native patella unresurfaced remains unknown. This study's purpose was to examine the effect of patellofemoral OA severity on PROMS at minimum 1-year in primary TKAs performed without patellar resurfacing.
Methods: 195 TKAs without patellar resurfacing were retrospectively reviewed. Preoperative patellofemoral OA was assessed in medial and lateral facets and graded on severity, marginal osteophytes, and joint space narrowing using Kellgren-Lawrence (KL) and OARSI atlas grading systems. All TKAs were performed using contemporary implants and modern perioperative protocols. Prospectively collected PROMS were evaluated at minimum 1-year follow-up in multivariate statistical models controlling for demographics and covariates.
Results: The cohort was 53% female with mean age and BMI of 61±11 years and 35±8 kg/m2. In multivariate regression, lateral patella KL grade of ≥2 was associated with lower pain scores and higher KOOS JR scores ($p \leq 0.013$), and a knee 'always feeling normal' at minimum 1-year (OR 2.37, 95%CI: 1.14-4.90, $p=0.020$). OA severity via marginal osteophyte and joint space narrowing grades were not associated with any PROMS in multivariate analysis with numbers available.
Conclusion: Interestingly, worse preoperative OA severity in the lateral patellar facet, graded with the KL system, predicted superior knee-specific PROMS in patients with unresurfaced patellae after contemporary TKA. This observation supports the clinical finding that patients with more severe OA have optimized patient satisfaction, and highlights the minimal contribution of patella OA to knee function after TKA for tibiofemoral disease. Further research is warranted to delineate selective patella resurfacing criteria for optimal TKA outcomes.

Selective Patella Resurfacing in Contemporary Total Knee Arthroplasty: A Matched Cohort Analysis

Schmidt G, Farooq H, Deckard ER, Meneghini RM

Background: Leaving the patella unresurfaced in total knee arthroplasty (TKA) is increasing due to modern patella-friendly implants, awareness that complications are not uncommon with resurfacing, and knowledge that historical studies were scientifically confounded for many reasons. The purpose of this study was to examine the effect of selective

patellar resurfacing on patient-reported outcome measures (PROMS) using modern implants and techniques.
Methods: 166 TKAs performed between 2012 and 2019 with patellar resurfacing were case-control matched to 166 TKAs without patella resurfacing. Indications for not resurfacing the patella were central congruent tracking, joint space preservation radiographically and ≤grade 3 patellar chondral damage. Case-control matching was based on age, sex, BMI, ASA-classification, preoperative comorbidities, and preoperative radiographic osteoarthritis severity scores. All TKAs were performed with contemporary patella-friendly components and modern perioperative protocols. Prospectively collected PROMS were evaluated at minimum 1-year follow-up.
Results: There were no significant differences between cohorts in demographics ($p \geq 0.347$), comorbidities ($p \geq 0.443$), or radiographic osteoarthritis severity scores ($p \geq 0.078$). Preoperatively, mean patellar tilt was less for the unresurfaced patella group (3 vs 4°, $p=0.003$); however, mean postoperative patellar tilt was not different (3 vs 3°, $p=0.225$). At minimum 1-year, there were no differences in PROMS between cohorts ($p \geq 0.090$); however, UCLA Activity Level was significantly higher for the unresurfaced patella group (6.4 vs 5.6, $p<0.001$) increasing from a slightly higher preoperative activity level (4.9 vs 4.4, $p=0.014$). There was no difference in all-cause reoperation rates between cohorts ($p=0.723$).
Conclusion: In modern contemporary TKA, not resurfacing the patella in select patients achieves equivalent minimum 1-year patient-reported outcomes and potentially greater functional activity level compared to patella resurfacing. Leaving select patellae unresurfaced will likely conserve healthcare resources, decrease cost, improve operative efficiency, and minimize resurfacing-related complications to the extensor mechanism. Continued research with contemporary implants and surgical techniques and enhanced scientific rigor is warranted.

The Contribution of Polytrauma and Hemodynamic Shock on Infection and Reoperation in Tibia and Femur Fractures: A Multivariate Regression Analysis

Schmidt G, Farooq H, Simpson A, Sharma I, Lopas L, Jang Y, Mullis B, McKinley T

Background: Tibia and femur fractures often result from high-energy injuries and frequently occur in the setting of polytrauma. Current literature suggests polytrauma is a risk factor for both delayed healing and nonunion of these fractures. Prior study in animal models have demonstrated a negative effect of hemorrhage on fracture healing. However, no clinical studies have delineated which components of polytrauma predict delayed healing or nonunion, and it is unknown if hemorrhage or shock at presentation contributes to postoperative complications after operative management of tibia and femur fractures.
Methods: A retrospective review of all tibia and femur fractures treated with an intramedullary nail (IMN) from 2013-2018 at a single level 1 trauma center was performed. Patients age 18-55 with a tibia fracture or femur fracture below the level of the lesser trochanter treated with IMN were eligible. 392 tibia and 367 femur fractures were included in the final analysis after all cases with pathologic fractures, planned revision for bone grafting, and subacute presentation were excluded. Patient specific variables including demographics, ASA, pH, base deficit, shock index, Injury Severity Score (ISS), open fracture, additional orthopaedic injuries, length of hospital stay, smoking, vascular injury, fasciotomies, use of external fixation, and postoperative weight bearing status were collected. Fractures were classified using the OTA/AO Classification. All data for reoperations were collected and categorized based on the indication(s) for surgery.
Results: There was no significant effect of ISS, pH, shock index, or base deficit on any of the analyzed outcomes. Multivariate analysis showed open fracture (Odds Ratio (OR)=4.85, $p<0.001$), fasciotomies (OR=2.32, $p=0.027$), restricted weight bearing (OR=1.92, $p=0.013$), and age (OR=1.03, $p=0.015$) correlated with overall reoperations. Deep infection was predicted by the need for flap coverage (OR=3.59, $p=0.050$) and open fracture (OR=3.12, $p=0.023$). Predictors of reoperation for aseptic nonunion included open fracture (OR=2.73, $p=0.0002$), smoking (OR=1.99, $p=0.018$), number of additional orthopaedic injuries (OR=1.12, $p=0.048$), and age (OR=1.03, $p=0.043$).
Conclusion: These results support previously published literature demonstrating the negative effect of soft tissue injury around the site of a fracture, but they do not show how shock at presentation effects the rate of reoperation, nonunion, or infection. There does not appear to be a clear link between the global magnitude of injury and reoperation whereas a high magnitude of local, soft-tissue injury resulting in open fracture, need for fasciotomies, and flap coverage had a significant effect on re-operation.

A connection between PTSD and schizophrenia and the need for better treatment for female veterans

Petroskey J, Tat K, Vander Missen T, Raza M

Case Description: A 57-year-old female with past medical history of schizoaffective disorder and alcohol use disorder in sustained remission, is admitted due to psychosis. She was reported missing by her husband and was later found wandering throughout the neighborhood. Her last visit with her outpatient psychiatrist was a month ago, at which time she was doing well. She is a veteran on full social support secondary to her psychosis.
Conclusions: A majority of returning veterans experience PTSD, and studies have suggested a possible connection between PTSD and developing schizophrenia. Reports show

a higher frequency of psychotic symptoms of schizophrenia in patients with PTSD, and certain studies have gone further to show a possible genetic component linking PTSD with schizophrenia. Thus, there could be dangerous future complications in patients with PTSD without proper diagnosis and treatment. This problem may be more prevalent in the female veteran population since they are the fastest growing group of veterans, less likely to use the VA compared to males, and tend to carry a greater psychiatric burden.
Clinical Significance: Since PTSD and schizophrenia present with similar symptoms, there may be failure to identify a comorbid psychotic disorder. This challenges traditional diagnostic boundaries with implication for treatment. Therefore, it is important for physicians to differentiate between psychosis and PTSD symptoms and to take notice of associated features of comorbidity so appropriate treatment can be provided. A recent study has shown that female veterans with PTSD treated in female-only settings report longer lengths of stay and have better adherence to treatment programs. Future work includes increasing the number of these programs along with decreasing the stigma of seeking mental health treatment.

Endogenous Maternal Lipids and Supplementation with Vitamin E Isoform Regulate Neonatal Dendritic Cells during Development of Allergic Disease

Tat K & Cook-Mills J

Background and Hypothesis: CDllb+CDllc+ dendritic cells (DCs) play a role in the development of allergic disease. It has been shown that of the vitamin E isoforms, α-Tocopherol decreases and γ-Tocopherol increases the generation of bone marrow-derived CD11b+CD11c+ DCs in vivo. And, in vivo experiments have also shown that β-glucosylceramides, endogenous maternal lipids, increase the neonate proliferation of this same subset of DCs. The mechanism for β-glucosylceramide regulation of these specific DC subsets is not known. Furthermore, it is also not known how vitamin E isoforms regulate DC development and differentiation. We determined whether α-tocopherol decreases and γ-tocopherol increases responses to β-glucosylceramide by regulating Protein Kinase C (PKC) activation during CDllb+CDllc+ DC differentiation and proliferation.
Project Methods: Cultured bone marrow cells (harvested from mice) were treated with lipid metabolites with and without supplementation of tocopherol isoforms, immunolabeled with antibodies that define DCs and with antibodies that detect active auto phosphorylated forms of PKC. Then, these cells were analyzed using flow cytometry.
Results: In vitro β-glucosylceramide elevated DC PKCα/β activity during CDllb+CDllc+ DC differentiation and proliferation/activation. Furthermore, these effects of β-glucosylceramide on DC PKCα/β activity were blocked by α-Tocopherol and elevated by γ-Tocopherol.
Potential Impact: These data provides a better understanding of how maternal β-glucosylceramide and dietary supplementation with vitamin E isoforms regulate DC proliferation and differentiation and ultimately development of allergic inflammation in offspring of allergic mothers.

Pathology Communication Following Endoscopy

Kabir J, Maratt J

Background: Colonoscopies and esophagogastroduodenoscopies (EGDs) are commonly performed to screen for polyps and Barrett's esophagus (BE), respectively. Findings from screening exams determine if, and when, surveillance is needed. Within the Veterans Health Administration (VHA), communication of test results is mandated; however, there is no clear guidance on how to communicate these results. The aim of this study was to determine the content and readability of endoscopy pathology letters that are used to relay results to patients within the VHA.
Methods: We used Corporate Data Warehouse to identify patients at VHA endoscopy sites nationwide who had a colonoscopy for colorectal cancer screening or post-polypectomy surveillance, or an EGD for BE screening or surveillance, between 2010-2018. We then identified patients who had either: low-risk colon adenomas (LRA), high-risk colon adenomas (HRA), non-dysplastic BE (NDBE), BE with low-grade dysplasia (BE-LGD), or BE with high-grade dysplasia (BE-HGD). Pathology letters for each of these findings were obtained and reviewed by two reviewers independently to categorize as containing 'alarming,' 'not alarming,' or 'balanced' terminology. The readability of each letter was determined by using Microsoft Word to obtain the Flesch-Kincaid reading ease and grade level equivalency scores. Preliminary results are presented below.
Results: Pathology letters from 8 VHA sites reviewed thus far were found to be non-alarming for LRAs and NDBE; balanced for BE-LGD; and balanced to alarming for HRAs and BE-HGD. The median Flesch-Kincaid reading ease and grade level equivalency scores for the letters were 43.3 and 10.4, respectively.
Conclusion and Potential Impact: While pathology letters may contain risk-appropriate terms to describe lesions, readability measures indicate that the content is written above the recommended 5th grade level for patient education materials. Improving the readability of pathology letters could improve patients' understanding of their risk status, thus leading to increased adherence to surveillance endoscopy recommendations.

Underweight is Associated with Mortality Among Ugandan Children with Plasmodium falciparum Severe Malaria

Brown LD, Datta D, Bond C, Namazzi R, Opoka RO, John CC

Background: The past two decades have witnessed a 60% decline in global malaria mortality. However, two thirds of all malaria deaths continue to occur among children <5 years, with a majority in the WHO African Region. Malnutrition is an important risk factor for malaria. Globally, wasting, stunting and being underweight are crucial indicators of malnutrition, and are associated with increased mortality in children <5. Those most vulnerable to malaria and malnutrition are children <5 living in Sub-Saharan Africa, particularly in rural areas often facing a higher burden of disease.
Objective: The objective of this study was to assess the prevalence and persistence of nutritional abnormalities causing children to be underweight, stunted, or show signs of wasting, and the association of these abnormalities with in-hospital and post-discharge mortality, risk of repeat illness and long-term sequelae in Ugandan children with 5 different forms of severe malaria (SM) compared to community children (CC).
Methods: We conducted a prospective observational study investigating neurocognitive outcomes at 12-months after severe malaria episode in 600 children with SM and 120 CC, aged 0.5-4 years, between 2014-2017 at 2 hospitals (Kampala and Jinja) in Uganda. Using age-adjusted scores from healthy CC, we calculated z-scores for weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ). We defined underweight, stunting, and wasting as 2SD below the WAZ, HAZ, and WHZ means.
Results: At baseline, children with SM had significantly lower mean WAZ and HAZ compared to CC (-1.1 [1.1 SD] vs. -0.47 [1.1], p<0.001; -0.68 [1.1] vs. 0.30 [1.0], p<0.001, respectively), with no difference by site. By 12-month follow-up there were no significant differences in nutritional markers between SM and CC. During admission, 44 (7.3%) children with SM died. Higher baseline WAZ was associated with decreased risk of in-hospital death in children with SM across the two sites (OR [95% CI] = 0.70 [0.51, 0.95], p=0.02), with no significant interaction between WAZ and site. Baseline HAZ and WHZ were not significantly associated with in-hospital mortality (OR [95% CI]) = 0.84 [0.66, 1.06] and 0.77 [0.57, 1.02], respectively). During the post-discharge period, 23 (4.4%) children with SM and 1 (0.9%) CC died prior to 12-month follow-up. Nutritional marker z-scores were not significantly associated with risk of post-discharge mortality in children with SM, overall and by site. However, children in Kampala who were underweight had increased odds of post-discharge mortality compared to those who were normal weight (OR [95% CI] = 4.18 [1.36, 12.84], p=0.01). Among those who survived in Kampala, higher WAZ was associated with increased risk of returning to clinic for any cause within 12-month follow-up (HR [95% CI] = 1.16 [1.06, 1.28], p=0.002), but was not significant for malaria sick visits or readmission. HAZ and WHZ in Kampala and all nutritional markers in Jinja were not significantly associated with return sick visits or readmission.
Conclusion: Underweight and stunting were worse in both sites among children with SM versus the controls at 1 month, and both of these nutritional parameters normalized by 12 months. In Kampala, low WAZ was associated with worse mortality outcomes after discharge, while high WAZ was associated with repeat clinic visits. In both sites, high WAZ was protective against in-hospital mortality. Chronic malnutrition and SM remain severe risk factors for mortality in Uganda. Weight status was found to have the most significant impact on mortality outcomes. The high incidence of mortality among children <5 with SM requires urgent intervention, and nutrition programs should be aimed at increasing weight, especially in the early months of disease.

Postoperative Pancreatic Fistula Following Traumatic Splenectomy: A Multi-center Analysis

Arnold P, Meagher A, Hartwell J

Background and Hypothesis: Development of postoperative pancreatic fistula (POPF) in cases of adult splenectomy following trauma occur in 1-3% of cases. Incidence of this complication leads to increased mortality rates, length-of-stays, and costs for patients. In cases where no previous pancreatic injury was noted, we hypothesized that the use of sutures in splenic hilum ligation instead of staples reduced the rate of incidence.
Methods: Adult trauma patients (age ≥17 years) that underwent non-elective splenectomy from 2010-2020 at Indiana University Methodist Hospital and Eskenazi Hospital were retrospectively evaluated from the hospitals' trauma registries. Patients were excluded if they were pregnant, currently incarcerated, expired within 72 hours of hospital admission, or had a pancreatic injury diagnosed preoperatively or intraoperatively. A logistical regression with Firth correction for rare events was used to analyze the data.
Results: 262 adult splenectomies following trauma occurred between 2010 and 2020 at Methodist Hospital; 160 passed exclusion criteria and were included in our analysis. 79 cases were conducted at Eskenazi Hospital during this period; 49 passed exclusion criteria. Sutures alone across hilar structures were used in 167 cases, 7 of which developed POPF (4.0%). Staples alone across hilar structures were used in 17 cases, 5 of which developed POPF (22.7%). A combination of staples and sutures was used in 11 cases, none of which developed POPF. 2 cases did not report their technique, but POPF did not develop in either of these patients. The use of staples alone in splenic hilum ligation holds an odds ratio of 6.983 (p<0.05) of POPF development compared to sutures alone. Individuals sent to interventional radiology prior to operation also developed POPF at a lower rate (3.3%) than those who were not (6.5%).

Conclusion:Our study finds a statistically significant increase in the rate of POPF formation when staples are used in splenic hilum ligation instead of sutures. In our 10-year retrospective review of POPF, we found the complication to be rare but morbid, with associated prolonged length of hospital and ICU stays and requiring multiple imaging studies and interventions, leading to increased costs. We conclude that further study of optimal technique for emergent splenectomy is warranted.

Failure to Launch: Risk Factors and Prevention in Same-Day Discharge Following TJA

Foley DP, Sonn KA, Ghosh P, Ziemba-Davis M, Meneghini RM

Background: Rapid recovery protocols have enabled the transition of total joint arthroplasty (TJA) from the inpatient to outpatient setting. However, reasons for same-day discharge (SDD) failure have not been comprehensively identified. This study explored barriers to successful SDD following primary TJA.
Methods: A retrospective review of 398 consecutive primary unilateral TJAs performed by a single surgeon at an academic center between 2017 and 2020 with planned SDD was performed. Failure of SDD was defined as lack of discharge before midnight on the day of the procedure. Failure to achieve SDD was examined in relationship to 35 demographic, medical, social, and psychological characteristics of patients; intraoperative factors; and postoperative complications.
Results: Fifty-seven percent of the sample was female, with average age and BMI of 58 (19 to 83) years and 31 (18 to 54) kg/m2. A binary logistic regression model retaining age, the Outpatient Arthroplasty Risk Assessment (OARA) score, morphine milligram equivalents (MMEs) consumed per hour, and postoperative urinary retention ($p \leq 0.003$) explained 74% of the variance in failed SDD. Every five year increase in age, 20 point increase in OARA score, and increase of 0.5 MMEs consumed per hour increased the likelihood of failure by 1.9 (95% CI 1.2, 2.9), 2.4 (95% CI 1.5, 3.8), and 4.0 (95% CI 2.4, 6.6) times, respectively. On average, patients who failed SDD (18±19) traveled fewer miles for surgery than those who achieved SDD (27±30, $p>0.05$).
Conclusion: Increasing age and comorbidities as reflected in OARA scores are predictive risk factors for failure to launch, highlighting the importance of patient selection when planning SDD. Urinary retention is a key complication that can prevent SDD. Successful outpatient TJA relies on the adoption of modern perioperative protocols, appropriate patient selection, and the ability to predict and prevent the common postoperative problems that routinely result in failure to launch.

The Impact of the COVID-19 Pandemic on the Mental Health and Health Care Use of Older Adults

Seibert T, Perkins AJ, Batista-Malat E, Fowler NR

Objectives: Fear of contracting coronavirus infection and mandatory stay-at-home orders may be associated with social isolation and loneliness, both risk factors for depression and anxiety. This study compared symptoms of depression and anxiety before and during the COVID-19 pandemic and to examine rates of loneliness and avoidance of health care seeking behaviors among a large sample of community dwelling older adults.
Methods: Participants were enrolled in the Caregiver Outcomes of Alzheimer's Disease Screening (COADS) trial and included 1,539 adults age ≥65 years old living in the community who receive primary care in central Indiana. Mean scores on the Patient Health Questionnaire-9 (PHQ-9) and Generalized Anxiety Disorder Scale (GAD-7) before and during the pandemic were compared. Measures of loneliness and behaviors regarding health care use were also compared.
Results: Baseline characteristics were similar between the pre-COVID-19 and during COVID-19 groups with the exception of age, race, and educational level. Nearly one-third of older adults and their caretakers reported feeling down or depressed. In addition, more than 40% felt nervous, anxious, or on edge as a result of COVID-19, and up to 20% of patients and caregivers also reported feeling alone or apart from others. Furthermore, 7% of patients and 6% of caregivers reported delaying care for possible medical emergencies during the COVID-19 pandemic.
Conclusion: Targeted interventions may help reduce the impact of COVID-19-specific social isolation on the mental health of older individuals. Further research on the indirect consequences of the COVID-19 pandemic is required to determine the impact of delaying treatment.

Impact of SSKI vs. Corticosteroids on Total Thyroidectomy for Graves Disease: A Retrospective Review

Baumgartner TC, Allison HR, McDow AD

Background: Graves disease is an autoimmune disorder resulting in overproduction of thyroid hormone. While medical management can be used to reestablish euthyroid state, definitive management includes radioactive iodine or total thyroidectomy. For patients undergoing thyroidectomy, SSKI is frequently prescribed preoperatively to decrease thyroid vascularity and intraoperative blood loss. However, a corticosteroid is often given when rapid preparation is necessary prior to surgery. This study explores the impact of SSKI compared to corticosteroids and hypothesizes that replacement of SSKI with corticosteroid will improve surgical outcomes.
Methods: We performed a retrospective review of 26 Graves

patients undergoing total thyroidectomy from 2015-2020. 18 patients received SSKI prior to surgery, 2 received a corticosteroid in addition to SSKI, 1 received a corticosteroid alone, and 5 received neither. Symptomatology, length of stay, intraoperative blood loss, transient hypoparathyroidism, and thyroid weight were compared.
Results: Patients receiving corticosteroids experienced shorter stays (1.0 day vs 1.3 days), greater postoperative parathyroid hormone levels (43.0 pg/mL vs 28.9 pg/mL), less intraoperative blood loss (14.4 mL vs 41.4 mL), and presented with smaller thyroid glands (30 g vs 47 g) compared to those who received SSKI. There was a statistically significant difference in estimated blood loss between the groups ($p = 0.0348$). For some patients, the addition of a steroid to SSKI decreased surgery time (1.98 hours vs 2.32 hours).
Conclusion: Despite limitations in sample size and the retrospective nature of this study, results suggest a positive impact of corticosteroid use on surgical and patient outcomes compared to SSKI alone. Future examination may benefit from greater sample size and equal distribution of patients among groups. We propose further exploration with a prospective study to evaluate the impact of SSKI vs. corticosteroids on surgical difficulty and postoperative complications for Graves disease patients.

Comparison of Diffusion and Perfusion Techniques in Differentiating High Versus Low Grade Pediatric Brain Tumors

Chen E, Ho C, Gray B, Parker J, Diller E, Wen Q, Wu Y, Anthony G, Territo R

Background/Objective: Brain tumors are the most common solid cancer in children and cause significant mortality and morbidity. We compare the effectiveness of different parameters in predicting tumor grade between dynamic contrast enhancement (DCE), intravoxel incoherent motion (IVIM), dynamic susceptibility contrast (DSC) perfusion and diffusion weighted imaging (DWI).
Methods: A retrospective blinded review of pediatric brain tumors with DCE, IVIM, DWI, and DSC was performed. Parametric maps were registered to T2 weighted images. Volumetric regions of interest (ROI) were manually segmented from solid tumor components for each patient by a neuroradiologist (CH), neuroradiology fellow (BG), and medical student (EC). Resulting mean values for parameters from DCE (Ktrans, Kep, Ve, Vp,), IVIM (D, D*, f), DSC (rCBV) and DWI (ADC) were compared using Student's t-test for high- and low-grade tumor groups based on WHO grading from pathology. For significant parameters, receiver operating characteristic (ROC) analysis with area under curve (AUC) was performed.
Results: 20 subjects were included with 9 low grade and 11 high grade tumors. Significant differences between low versus high grade were demonstrated for D (10−3 mm2/s) (1.4±0.4 vs 0.9±0.2, p=0.01), f (0.04±0.02 vs 0.07±0.02, p=0.02), ADC (10−3 mm2/s) (1.4±0.4 vs 0.9±0.3, p=0.009) and rCBV (2.2±0.9 vs 4.7±2.1, p=0.003). No significant difference was found for D* or any DCE parameter. AUC from ROC was similar for all significant parameters [D (0.81, p=0.003); f (0.80, p=0.003); ADC (0.83, p=0.001); rCBV (0.83, p=0.0005)].
Conclusion: D and f parameters from IVIM can significantly differentiate high versus low grade pediatric brain tumors similar to ADC and rCBV. Conversely, no DCE parameter was significant.
Scientific Implications: The results will assist the selection of MRI sequences that best predict tumor grade, as well as guide tumor biopsy for the most aggressive tumor portions. Further study of these techniques may correlate with molecular profiling and predict outcome.

Depressive Symptom Screening in Youth Using a Community Diabetes Prevention Clinic

Wright A, Yazel-Smith L, Hannon T

Background: Rates of youth diagnosed with diabetes and prediabetes are increasing and comorbidities like depression warrant strict monitoring to improve patient outcomes.
Objective: The aim was to determine if increased depressive symptoms are associated with worse clinical findings, including BMI, obesity, diabetes, prediabetes, hemoglobin A1c (HbA1c), and demographic variables including age, gender, and race.
Methods: The study is a retrospective chart review of patients referred to the Youth Diabetes Prevention Clinic (YDPC) based on increased risk for type 2 diabetes (T2D). Patient Health Questionnaire (PHQ-9) forms, a 9-question depressive symptom screening tool, were evaluated for each patient. Total scores were assessed categorically, using a cut point of >=10 which indicates possible depression and a need for further evaluation. All data were evaluated for clinic visits occurring between 2013 and 2020.
Results: 178 patients filled out PHQ-9 pre-screening forms and returned them to clinic. Age ($p < 0.01$), sex ($p < 0.01$), BMI ($p < 0.01$), HbA1c ($p < 0.01$), and obesity diagnosis ($p = 0.01$) were associated with increased depressive symptoms based on screening score cutoff. Race ($p > 0.05$), BMI z-score ($p = 0.18$), prediabetes diagnosis ($p = 0.92$), and diabetes diagnoses ($p = 0.05$) were not. Middle adolescent youth were nearly 3.5 times more likely than early adolescents to fall into the moderate/high risk category for depression. Females were 2.6 times more likely and those with higher HbA1c or an obesity diagnosis were nearly 3 times more likely. A modest portion (36.5%) in this sample met criteria for possible clinical depression.
Conclusion and Impact: Patients at risk for prediabetes and diabetes should be screened for depressive symptoms in order to address and combat its adverse effects on diabetes management. Older youth, females, and those with obesity and higher HbA1c values may be at particularly higher risk of having increased depressive symptoms.

Being Born into a Pandemic: COVID-19 and Pregnancy

Swiezy S, Campbell M, Eckert N, Coutinho K, Yeagley T

Case #1: 34yo Asian female G2P1001 presents COVID19+ in 1st trimester. PMH insignificant. Meds: prenatal vitamins. Surg Hx: c/s healthy boy (2017). No h/o GHTN, GDM, or eclampsia. D/t COVID19+ infection, frequent fetal u/s monitoring done at 32w5d, 34w5d, 38w0d. Fetal growth over time: 63.4%, 48.8%, 14.3%. Fluid over time: AFI 8.58cm, MVP 4.52cm; AFI 10.86, MVP 3.52; AFI 2.73, MVP <2. Oligohydramnios diagnosed at 38w0d; emergent repeat c/s performed. Mother and baby healthy s/p delivery, d/c home on PPD#2. Pathology of placental tissue shows increases in villous fibrin accumulation and maternal vascular malperfusion.
Case #2: 29yo Caucasian female G1P0 presents to ED at 18w4d with c/o runny nose, cough, and headache; temp. 100.3*F; tests COVID+. PMH insignificant. Meds: prenatal vitamins. No h/o GHTN, GDM, or eclampsia. 21w0d u/s: growth 71.4%, normal anatomy. 30w0d u/s: growth at 82.3%, AFI 15.10cm, MVP 5.38cm. At 39w1d, healthy infant boy (7lb12oz) via VAVD. Mother and baby healthy s/p delivery, d/c home on PPD#2. Placenta not sent for surgical pathology.
Conclusion: Due to the short time course of the COVID19 pandemic, adequate evidence to link maternal-fetal outcomes to infection during pregnancy is just now becoming available. Other coronaviruses, SARS and MERS, are preferentially fatal in pregnant mothers; and, adverse perinatal outcomes in COVID19+ women are appearing. Case reports have associated COVID19 with preterm birth; one study reported 47% preterm deliveries in COVID19+ mothers. Molecular studies have confirmed ACE2 (receptor allowing viral cellular entry) mRNA overexpression in placentas. Placental histopathology has shown maternal-placental interfacing blood vessel anomalies.
Clinical Significance: COVID19 represents a monumental threat to public health. Pregnant women and fetuses may be at increased risk for complications compared to the general public. As yet, the relationship between COVID19 and pregnancy remains to be clarified and will require further investigations to understand associations and promote evidence-based treatment practices.

Motivations of Utilizing Midwifery and Birthing Centers over Hospital-Based Obstetrics Care in Rural Indiana

Eckrote E, Danek R, Reyes E

Midwifery has been around for centuries and has only recently been overtaken by obstetrician attended hospital-based births. However, women all over are still turning to midwives for their prenatal, birth, and post-natal follow-up obstetric care. There are numerous studies examining the motivations of women who seek out midwives, but few focus on rural women. For example, in studies using large urban populations, we know women choose midwifery because of the lower costs, more natural methods of pain management (such as breathing techniques and water births), longer prenatal visits, options for faith-based care, and more variety in birthing position and location options. Likewise, studies have shown that rural women seek out community births, births that take place in the home or a birthing center, at a rate far higher than their urban counterparts. Given the paucity of data on rural midwifery care and the increased utilization of midwifery in rural areas, there is a need for rural-specific research. This knowledge could be imperative for re-examining insurance coverage, birth data, pre-natal care records, and the rural healthcare system. For these reasons, it is imperative to learn if the women seeking care at rural midwifery practices and birthing centers are reflective of those seeking midwifery care nationwide.
This study examines the reasons why women are seeking midwifery care over the now traditional hospital-based obstetrical care. Data has been collected through a survey at three midwifery practices in Indiana and examines the values in obstetrics care, birth, and post-partum follow-up, in addition to other motivating factors, in women who have chosen midwifery care. The results of this study provide insight into the motivating factors that are leading women to choose midwifery and can influence clinical practice for both midwives and obstetricians, guide patient expectations, improve provider interactions, and change the way we view the rural midwife in our Midwest communities.

TB or not TB: A case of tuberculous mastitis with possible Poncet's disease

Fraser AL and Gandhi D

Tuberculosis (TB) is a common pathogen worldwide that is less commonly diagnosed in the USA with a host of clinical manifestations. Herein we will present a patient with tuberculous mastitis (TM) and possible Poncet's disease (PD).
A 32 year old Yemeni female presented with right breast pain for two weeks. Physical exam was significant for a tender, mobile breast lump without erythema or discharge. Ultrasound of the breast showed a 2.6 x 1.5 x 1.8 cm irregular hypoechoic mass. Biopsy showed noncaseating granulomatous inflammation with occasional histiocytic giant cells and negative acid-fast bacillus (AFB) staining. Several weeks later the patient returned for worsening joint pain involving the back and bilateral wrists, ankles, and knees. Imaging of the affected joints was unrevealing. Lab findings were significant for elevated ESR and CRP with negative rheumatologic workup. The patient was started on prednisone with little benefit for a presumed diagnosis of seronegative rheumatoid arthritis. A QuantiFERON gold test was positive for TB though chest x-ray showed no evidence of pulmonary TB. Given the findings, the diagnosis of TM was

made. With this diagnosis of extra-articular TB and symmetric joint pains the diagnosis of concomitant PD was raised as well. The patient began treatment for TB and is being monitored by infectious disease.
Both TM and PD are rare conditions that are difficult to diagnose. TM is a rare clinical entity, but is more common in south Asia and Africa. Diagnosis is based on clinical suspicion, granulomatous lesion on biopsy, and response to TB therapy. Since TM has few organisms, AFB culture is lower yield compared to other samples such as sputum. PD is a rare para-infective symmetrical polyarthritis that involves predominantly the large joints. It can precede, follow, or manifest concomitantly with features of active, generally extra-pulmonary TB. The diagnosis is largely clinical and patients generally improve with TB treatment.

Pedicled Cervical Lymphoadipose Tissue for Volume Reconstruction after Superficial Parotidectomy

Davis KP, Fraser AL, Shay EO, Sim MW

Volume restoration is often required after parotidectomy due to the resultant facial contour deformity. Common procedures include local pedicled flaps, such as the sternocleidomastoid muscle flap, fat grafting, and even autologous free flaps, for more extensive defects. Local pedicled flaps have the advantage of a single surgical site, which spares the patient the added morbidity of a separate fat graft donor site, while simultaneously reducing the operative time. We report two cases of a novel reconstructive option using pedicled level I and II cervical lymphoadipose tissue for volume restoration after superficial parotidectomy. This reconstruction would be useful for patients with benign parotid lesions and inferior parotid defects. In addition, with maintained blood supply to this tissue, it would likely provide sustained bulk over time.

Pineal gland hypermetabolic involvement without central nervous system symptoms in a pediatric patient with primary nodular sclerosis subtype classical Hodgkin Lymphoma

Kokoska R, Beltz E, Smith J, Razzouk B

This case report presents the first reported pediatric case of primary classical nodular sclerosing Hodgkin Lymphoma (HL) with pineal gland involvement, presenting without CNS symptoms, which completely resolved after 2 cycles of chemotherapy. The 12 year-old male first presented with a right inguinal mass and external iliac lymphadenopathy accompanied by B symptoms. He was diagnosed with stage IV B classical HL, and as part of the staging work-up, a full-body PET/CT scan was performed. In addition to the right inguinal mass, the PET/CT demonstrated increased FDG uptake at the pineal gland along with level II lymph nodes. The patient was treated with ABVE-PC chemotherapy (Doxorubicin, Bleomycin, Vincristine, Etoposide, Prednisone, and Cyclophosphamide) as per standard arm of AHOD1331 COG protocol for newly diagnosed high-risk HL patients, which resolved the pineal mass after 2 cycles without requiring radiation therapy. Following 5 cycles, a full-body PET/CT showed no brain or neck activity, along with decreased size and activity of the right groin mass.
To our knowledge, there are no other documented cases of primary HL with specific pineal involvement, and no cases that lack CNS symptoms altogether like this one did. Additionally, this is the third published pediatric case of primary CNS-HL, both of the previous cases were treated with radiotherapy and presented with CNS symptoms. Thus, this case demonstrates the importance of ordering a full-body PET/CT as part of the initial HL work-up and provides evidence that chemotherapy alone is a treatment option for some patients with primary intracranial HL.

Family Planning and Abortion Curriculum Topics are Not Adequately Covered in Medical School Pre-Clinical Years

Komanapalli S, Brown L, Swiezy S, McKinzie A, Bernard C

Introduction: In the United States, one in four women will have an abortion by age 45. Therefore, abortion is an extremely common medical procedure that many patients will experience and an exceedingly important topic that should be covered by medical education. However, medical schools often do not sufficiently educate students about this essential medical procedure. Our study sought to determine whether Indiana University School of Medicine (IUSM) adequately educates students about reproductive health topics, such as abortion and contraception.
Methods: We distributed a survey to perform a cross-sectional analysis of medical students to assess interest, exposure, and preparedness to counsel surrounding reproductive health topics.
Results: We surveyed 303 students with 61.72% being female, and 74.3% white. The majority of the students surveyed expressed a desire to learn about reproductive health topics, including abortion counseling, with 83% students reporting that IUSM should enhance its reproductive health curriculum. When asked if students felt prepared to counsel patients about various topics, only 18% responded "yes" regarding abortion options. In stark contrast, the majority felt prepared to discuss options for beta blockers (66%) and antidepressant therapy (70%) with patients. Most students surveyed said they would prefer abortion and contraception counseling instruction to occur during medical school as opposed to residency or fellowship.
Discussion: Our results suggest that while students expect to learn about abortion and contraception in medical school in order to adequately counsel patients, the current curriculum does not meet this need. Our study was limited by the number of students surveyed (20% of total student body)

and an over-representation of female and white students. In future studies, we would seek to sample a larger and more representative cross-section of students. We aim to use this data to improve our institution's curriculum so that it better prepares students for careers in medicine.

Understanding the health needs and priorities of people who access comprehensive harm reduction programs

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Substance use disorder is a common cause of morbidity and mortality in the United States. Comprehensive harm reduction programs have emerged as a public health strategy to help those with substance use disorder. At this time, little is known about the population of people who utilize comprehensive harm reduction programs. To address this gap in knowledge, we examined health needs and priorities among people who utilize a comprehensive harm reduction program. We conducted in depth semi-structured interviews with 29 people who access services at a harm reduction program. Themes from the qualitative interviews revealed priorities included improving housing stability, sobriety, and reunification with children. Lack of trust of the health care system was often reported as a barrier to optimal medical care. Comprehensive harm reduction programs are in a position to offer services that can help improve physical health and social determinants of health for people with substance use disorder.

Subfascial epidural drainage protocol following intraoperative durotomy in posterior thoracic and lumbar spine surgery: reoperation prevention and outcomes among drained and undrained cohorts

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Introduction: Persistent CSF leak following intraoperative durotomy in posterior thoracic or lumbar spine surgery may lead to devastating complications often requiring reoperation, resulting in increased cost and morbidity. In this study we evaluate the safety and efficacy of our subfascial epidural drainage protocol designed to prevent CSF leak-related complications and reoperation in the setting of intraoperative durotomy.
Methods: We performed a retrospective review of drained and undrained cohorts at our institution to identify associated and protective factors for reoperation
due to persistent CSF leak-related symptoms. Incidence of reoperations, perioperative
complications, need for rehabilitation, and readmission were compared between cohorts. This protocol included primary durotomy repair if possible, followed by subfascial epidural drainage at full suction for up to seven days postoperatively. Drain was removed if persistent position headaches were present despite drainage at half suction or to gravity, head-of-bed recumbency, and caffeine supplementation.
Results: Among 170 patients (mean 18.5 month follow up), 156 underwent our subfascial epidural drainage protocol and 14 patients were undrained. Drainage for up to 7 days was associated with a significantly lower incidence of reoperation than no drainage (3.3% vs. 14%, respectively; p 0.03). No significant difference in perioperative complication incidence between cohorts was observed (12.8% vs 21.4%, respectively; p 0.37). Hospital LOS was unchanged regardless of drainage (median 7 days). Subfascial drainage conferred a significant risk reduction in inpatient rehabilitation requirement (RR 0.55) as well as 30-day (RR 0.31) and 90-day readmission rates (RR 0.36).
Conclusion: This subfascial epidural drainage protocol was successful in preventing reoperation for CSF leak-related symptoms without added cost or morbidity to the patient.

Mithramycin-A Prevents Early Diet-Induced Insulin Resistance in C57BL/6NJ Mice

Covert J, Grice B, Thornburg M, Tackett L, Bhamidipati T, Stull N, Kim T, Habegger K, McClain D, Elmendorf J

An inverse correlation between cholesterol content and glucose disposal rate is seen in human muscle biopsies from individuals across a range of insulin sensitivities. In vitro studies suggest increased hexosamine biosynthesis pathway (HBP)-mediated Sp1 transcription of HMG-CoA reductase (HMGR) as a mechanism of cholesterol accumulation and insulin resistance (IR). The aim of this study was to determine if Sp1 inhibition with mithramycin-A (MTM) would prevent muscle cholesterol buildup and IR seen in mice fed a HF diet for one week. Mice fed this short-term HF diet did not have an increase in adiposity, lean mass, or body mass, nor did daily MTM treatments affect body composition, caloric intake, or activity. However, this diet caused significant glucose intolerance and IR that MTM prevented. Consistent with this drug inhibiting Sp1 transcriptional activity, skeletal muscle Sp1 binding to the HMGR promoter was blocked. Similarly, MTM restored insulin sensitivity in mice with targeted muscle overexpression of glutamine-fructose-6-phosphate-amidotransferase, the rate-limiting HBP enzyme. Concomitant increases in HMGR expression and cholesterol were measured in muscle from transgenic mice and these were mitigated by MTM. These data identify increased HBP/Sp1 activity as an early mechanism of IR. Therapies targeting this mechanism may decelerate type 2 diabetes development.

Predicting cerebral vasospasm by the severity of hyponatremia after aneurysmal subarachnoid hemorrhage

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Background: Patients who suffer from aneurysmal subarachnoid hemorrhage (aSAH) are at increased risk of developing hyponatremia. Previous studies defining hyponatremia by serum sodium levels have led to controversial conclusions on the relationship between hyponatremia and cerebral vasospasm. We stratified hyponatremia based on severity of clinical treatment and aimed to determine if the treatment of clinical hyponatremia is independently associated with cerebral vasospasm.
Methods: A retrospective analysis of consecutive patients who presented and were treated for aSAH at our institution was conducted from 2008 to 2020. Patients were stratified by their hyponatremia treatment and evaluated for their relationship with cerebral vasospasm, inpatient vasospasm therapies, and discharge outcomes.
Results: Out of 992 patients, 873 met the inclusion criteria for aSAH. Hyponatremic patients were more commonly male ($p < 0.001$) and more likely to undergo external ventricular drain placement ($p = 0.03$) and endovascular coiling ($p = 0.016$). Patients with mild hyponatremia had similar outcomes to patients with eunatremia. Moderate hyponatremia was associated with medical vasospasm therapy ($p = 0.029$). Multivariate analysis demonstrated both radiographic ($p = 0.001$) and clinical ($p = 0.048$) vasospasm were associated with poor clinical presentation as indicated by the Hunt and Hess grades. Severe hyponatremia treatment was associated with radiographic vasospasm ($p = 0.002$) and clinical vasospasm ($p = 0.004$).
Conclusion: Hyponatremic patients were sicker at presentation than normonatremic patients, requiring EVD placement and endovascular coiling more frequently. Despite this, hyponatremic patients were discharged home more frequently. When stratifying the hyponatremic population by severity of clinical treatment, cerebral vasospasm was correlated with the increasing severity of hyponatremia and need for advancing treatment. Patients treated for severe hyponatremia should be monitored closely for cerebral vasospasm. Future prospective studies are warranted to further elucidate the relationship between hyponatremia and cerebral vasospasm.

More is not always better: A case of excess calcium carbonate ingestion causing milk-alkali syndrome

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Case description: A 54-year-old female with a medical history significant for chronic kidney disease stage IV (baseline creatine 3) and alcohol use disorder presented to the Emergency Department with altered mental status. Labs were significant for sodium 123, potassium 2.3, chloride 56, bicarbonate 47, creatinine 9.5, and calcium 10.8. Ultimately, her symptoms were discovered to be due to excessive ingestion of calcium carbonate (aka: Tums), and she was diagnosed with milk-alkali syndrome (MAS). She was treated with IV KCl and normal saline, with frequent lab checks, and her labs and mental status normalized over the subsequent 48 hours. Clinical Significance: MAS is constituted by metabolic alkalosis, acute kidney injury, and hypercalcemia. It is a result of a large intake of calcium and absorbable alkali. The syndrome was first recognized in the early twentieth century, and it essentially disappeared when histamine blockers began being used to treat peptic ulcers in the 1980s. Recently, the syndrome is becoming more common with the increased use of calcium-carbonate in antacids and osteoporosis prevention medications. MAS is the third most common cause of hypercalcemia, after malignancy and hyperparathyroidism. Management involves holding calcium and vitamin D supplements and administering aggressive intravenous hydration. Bisphosphonates and dialysis may be useful in severe cases. Prognosis of MAS is typically good as the condition is reversible.
Conclusion: The prevalence of MAS is increasing due to the wide availability of calcium-containing supplements and antacids. In order to counteract this, increased awareness amongst at risk patient populations, such as the elderly and those with renal disease, is vital. Lastly, clinicians should be able to recognize this syndrome or consider it in their differential, since intervention is crucial to prevent morbidity and mortality.

Adherence Barriers to Breast Cancer Treatment: Fragmentation of Care, Mood Disorders, and Substance Use Disorder

Wells L, Brown L, Heitz A, Newton E

Case: The patient is a premenopausal, recently divorced 40-year-old female with a history of anxiety, depression, and alcohol use disorder. She presented with a 3-month history of a palpable right sided breast mass and was found to have Stage IIIA ER+ PR+ invasive ductal carcinoma of her right breast. She successfully completed neoadjuvant chemotherapy followed by a right mastectomy and axillary node dissection. She subsequently had a relapse in her alcohol use disorder and was admitted twice to inpatient treatment centers. As a result, she has had inconsistency in taking her adjuvant antiestrogen therapy and in completing the recommended course of radiation. Her substance use led to the loss of her job, custody of her children, and nearly every social support.
Conclusions: We identified three primary barriers to adherence to cancer treatment: fragmentation of care, mood disorders, and substance use disorder. As a result of these mental health and systemic communication challenges, her treatment was interrupted, and she has since been lost to

follow-up.
Clinical Significance: As many as 28% of breast cancer patients do not complete their recommended treatment, which increases risk for recurrence. Discontinuation of and non-adherence to therapy for breast cancer are associated with increased mortality. Among these patients who have difficulty with adherence, a common barrier is fragmentation of care. Studies have also indicated that mood disorders may play a role in non-adherence to treatment. Prevalence of depression is as high as 24% among breast cancer patients. Furthermore, rates of substance use disorders in cancer patients can reach up to 35%. Substance use disorders have been associated with higher rates of non-adherence to hormonal therapy in individuals diagnosed with ER+ breast cancer. Interventions aimed at better screening for mood and substance use disorders and at reducing fragmented care are important steps in increasing adherence among these patients.