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JANUARY 31-FEBRUARY 1, 2025

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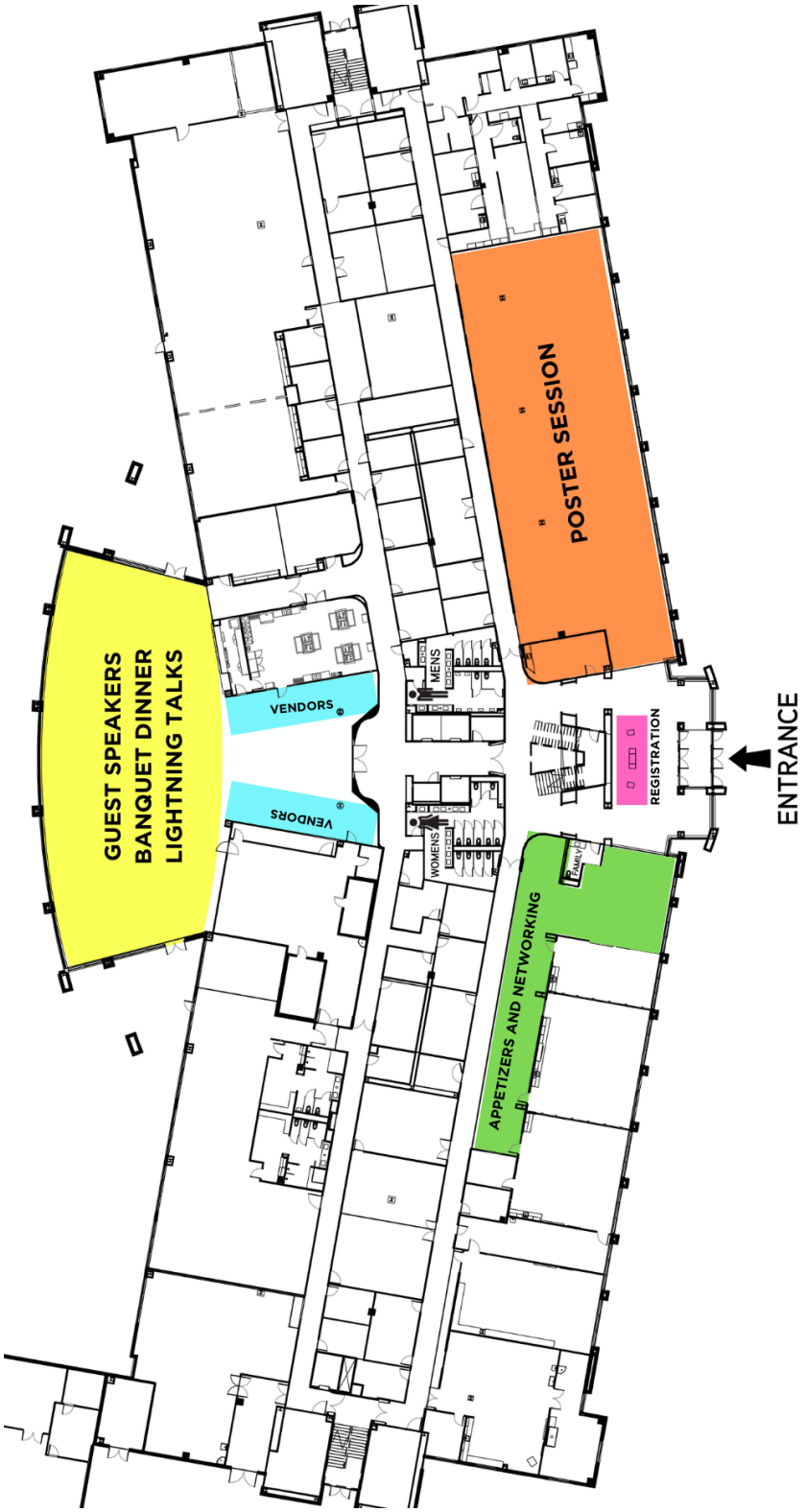
POSTER SESSION
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VENDORS
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REGISTRATION
ENTRANCE
APPETIZERS AND NETWORKING
FAMILY

AGENDA

Friday, January 31st

3:00 PM	Attendees Check-in	Registration Desk
3:30 PM	Guest Speaker- Anna E. Boone, PhD, OTR/L, MSOT, CBIS **"Optimizing function: Use of metacognition in cancer-related cognitive impairment"**	Event Center
4:30 PM	Appetizers and Networking	East Gallery
5:30 PM	Banquet Dinner	Event Center

AGENDA

Saturday, February 1st

8:30 AM	Attendees Check-in, Breakfast	East Gallery
9:00 AM	Guest Speaker- Kaci Handlery, PT, DPT, NCS Reed Handlery, PT, DPT, PhD **"Group Exercise for People with Neurological Diagnoses Using a Community-Academic Partnership"**	Event Center
10:00 AM	Poster Session	West Gallery
12:00 PM	Lunch	East Gallery
1:00 PM	Lightning Talks	Event Center
2:00 PM	Guest Speaker- Tiffany Miles, PhD **"Impact of Malnutrition on Neuroendocrine Development and Metabolic Function"**	Event Center

FEATURED SPEAKER

Anna E. Boone, PhD, OTR/L, MSOT, CBIS

Assistant Professor of Occupational Therapy
University of Missouri

Dr. Boone is director of the Optimal Performance & Enhanced Neurorehabilitation (OPEN) Lab, which seeks to develop and evaluate clinically feasible assessments and interventions to support evidence-based neurorehabilitation. The ultimate goal of this research is to improve performance of meaningful everyday activities and quality of life for individuals with acquired brain injury (i.e. stroke, traumatic brain injury, cancer-related cognitive impairment). Specifically, the OPEN laboratory evaluates (1) psychometric properties of cognitive assessment tools, (2) efficacy of functional cognitive interventions in neurologic populations, and (3) optimization of rehabilitation interventions with non-invasive brain stimulation methods.

FEATURED SPEAKER

Kaci Handlery, PT, DPT, NCS

Assistant Professor of Physical Therapy
Arkansas Colleges of Health Education

Kaci Handlery is an Assistant Professor in the School of Physical Therapy at the Arkansas Colleges of Health Education. She received her Bachelor of Science degree in Exercise Science from Indiana State University, her Doctor of Physical Therapy degree from the University of South Carolina, and is pursuing her Doctor of Education with a concentration in Educational Leadership. She is a Board-Certified Clinical Specialist in Neurologic Physical Therapy with over nine years of clinical experience primarily treating individuals with spinal cord injury, brain injury, stroke, and complex orthopedic trauma in the acute phase of recovery. She previously served as a research physical therapist at the Motor Behavior and Neuroimaging Laboratory at the University of South Carolina investigating the effects of upper extremity task-oriented training interventions for people with chronic stroke. Her current research interests include utilizing qualitative methodology to investigate the impact and lived experiences of community-based physical activity and exercise interventions for people with neurologic diagnoses.

FEATURED SPEAKER

Reed Handlery, PT, DPT, PhD

Assistant Professor of Physical Therapy
Arkansas Colleges of Health Education

Dr. Reed Handlery is an assistant professor in the School of Physical Therapy. He completed his Doctorate in Physical Therapy and PhD at the University of South Carolina. His research focuses on community-based physical activity interventions for individuals with neurological diagnoses.

FEATURED SPEAKER

Tiffany Miles, PhD

Instructor, Arkansas Children's Nutrition Center
University of Arkansas for Medical Sciences

Tiffany Miles, PhD is an Instructor in the Section of Developmental Nutrition in the UAMS Department of Pediatrics and faculty at the Arkansas Children's Nutrition Center. She investigates the impact of maternal nutrition on offspring neuroendocrine development and its broader impacts on brain development and nutritional programming in children. Dr. Miles recently was awarded a pilot grant from the UAMS Translational Research Institute that will support a project she developed as part of TRI's Community Based Participatory Research Scholars Program, which involves collaborations between UAMS-affiliated researchers and community-based organizations to address health disparities and promote community health and well-being. Dr. Miles received her PhD from UAMS in 2020 and recently completed a postdoctoral fellowship in the Department of Neurobiology and Developmental Science at UAMS. She was a recipient of the 2021 ACRI/ABI Postgraduate Research Grant Award and a 2023 graduate of the two-year TRI Health Sciences Innovation and Entrepreneurship Training Program.

Research Institute

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ABSTRACTS

Cold Truths vs. Warm Realities After Cardiac Arrest

Komal Abbas (OMS-III)[1], Omair Khan (OMS-III)[1], Saad Saleem (OMS-III)[1], Danial Nasim (OMS-III)[1]

[1]Arkansas Colleges of Health Education

Targeted temperature management (TTM) with mild therapeutic hypothermia (maintaining a core body temperature of approximately 33°C) has long been considered the gold standard for improving neurological outcomes in comatose patients after out-of-hospital cardiac arrest (OHCA). However, recent studies have raised questions about its efficacy and safety, challenging the widespread use of aggressive cooling protocols. This research synthesizes data from pivotal trials and systematic reviews to reassess the risks, benefits, and clinical utility of TTM, aiming to refine the approach to post-cardiac arrest care. Our findings contribute to a more precise understanding of how to optimize outcomes while minimizing complications.

This study focuses on adult patients who remained comatose following out-of-hospital cardiac arrest and who achieved return of spontaneous circulation (ROSC). The patient population included individuals with both shockable and non-shockable initial rhythms. Inclusion criteria required sustained ROSC, an identifiable cause of arrest, and absence of preexisting severe comorbidities. Exclusion criteria included significant trauma, refractory cardiogenic shock, or terminal illness. The study design incorporated blinded assessments of neurological outcomes in randomized controlled trials (RCTs), as well as complementary data from open-label studies.

We conducted an in-depth analysis of multiple high-quality studies, including several large RCTs and a systematic review. A landmark trial, involving 1,900 comatose OHCA survivors, randomly assigned participants to one of two groups: therapeutic hypothermia (target temperature of 33°C) or normothermia (target temperature ≤37.5°C, with active fever prevention above 37.8°C). Both groups received sedation and standard critical care support. Patients in the hypothermia group underwent controlled cooling, followed by gradual rewarming over 28 hours. Key outcomes were assessed at six months, including all-cause mortality, functional neurological recovery (measured by the modified Rankin Scale, with scores of 0-3 indicating favorable recovery), and adverse event rates.

The analysis revealed no statistically significant differences in six-month all-cause mortality rates between the hypothermia and normothermia groups. Additionally, the proportions of patients achieving favorable neurological outcomes (modified Rankin Scale scores of 0-3) were comparable between groups. However, the hypothermia group demonstrated a significantly higher incidence of adverse events, particularly arrhythmias causing hemodynamic instability (24% in the hypothermia group vs. 17% in the normothermia group, $p<0.001$). Findings from the systematic review corroborated these results, consistently showing no clear advantage of hypothermia over normothermia in improving neurological recovery or survival.

These findings represent a pivotal shift in the clinical approach to TTM in post-cardiac arrest care. While earlier studies suggested substantial benefits of therapeutic hypothermia at 33°C, contemporary evidence highlights the importance of targeted fever management rather than aggressive cooling. Specifically, maintaining normothermia and preventing fever (defined as a core temperature >37.8°C) appear to be equally effective in promoting neurological recovery, with fewer associated risks. Hypothermia protocols, though well-intentioned, carry increased risks such as arrhythmias, hemodynamic instability, and the potential need for paralytic agents. By moving away from routine therapeutic hypothermia and focusing on fever prevention, clinicians may achieve comparable outcomes while reducing the burden of adverse events. This evolving perspective underscores the necessity of evidence-based, patient-centered strategies in post-cardiac arrest care, aiming to optimize recovery and improve overall survival rates.

The Need for Enhanced Screening Protocols for Abdominal Aortic Aneurysms in Older Females

Samuel Adams, M.S. (OMS-II)[1], Evan Rosenzweig, M.S. (OMS-II)[1], Lucyna Bowland, PhD[1], Paul McGowan, DO[1]

[1]Arkansas Colleges of Health Education

Abdominal aortic aneurysms (AAA) are localized dilations of the abdominal aorta resulting from the thinning and weakening of the aortic wall. If left untreated, AAAs can progressively enlarge, heightening the risk of rupture, intraperitoneal hemorrhage, and death. Current guidelines from the U.S. Preventive Services Task Force (USPSTF) recommend routine AAA screening for males aged 65 to 75 with a history of smoking, while largely excluding females in the same age group, despite the potential for similar risk factors. The USPSTF cites a lower prevalence of AAA in females as the basis for the discrepancy in screening guidelines, but evidence supporting this claim remains limited.

In a cohort of 16 donors from the Arkansas Colleges of Health Education (7 males, 9 females, mean age = 78.6), we identified three females over the age of 65 with AAAs (33%), a prevalence significantly higher than that reported in the general population (0.0-5.2%). Two of these females suffered aneurysm ruptures, presenting with massive internal bleeding of the peritoneal cavity. One rupture was documented as the cause of death, while the other was discovered postmortem during cadaveric dissection. Both aneurysms were located between the superior mesenteric and common iliac arteries. The third female had two AAAs, each located between the superior and inferior mesenteric arteries.

These findings underscore the importance of considering a range of key risk factors when screening for AAA, including age, tobacco use, hypertension, atherosclerosis, genetic predisposition, and family history. Notably, nearly half of U.S. adults over the age of 20 are diagnosed with hypertension, yet fewer than 40% of these patients have their condition adequately controlled. While men over 65 with a history of smoking are at high risk, it is crucial to recognize that both sexes may be affected, and these factors contribute significantly to the development of AAAs across individuals. Based on our findings and the existing gaps in current screening guidelines, we argue that the USPSTF recommendations for AAA screening in females are insufficient and propose expanding screening protocols to include females over 65. Thereby, improving early detection and prevention for this at-risk population.

Sensitivity and Specificity of Waist-to-height Ratio in Screening for Type 2 Diabetes Among Asian Americans

Alexandria Ahlm (OMS-III)[1], Kathaleen Briggs Early. PhD, RDN, CDCES[1], Daniel Murphy, PhD[2], David L. Gee, PhD[3]

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[2]WestEd
[3]Central Washington University

Introduction

BMI is the most frequently used metric for diagnosing obesity and screening for chronic disease risks like type 2 diabetes (T2D). Asian populations, who develop obesity at lower BMI than non-Asians, have high rates of undiagnosed T2D despite adjusted BMI ranges. We evaluated the efficacy of waist-to-height ratio (WHtR) as a screening tool for T2D in both Asian and non-Asian populations, relative to BMI, to determine if this BMI alternative may result in increased capture of undiagnosed T2D patients.

Methods

Data came from four two-year cycles of National Health and Nutrition Examination Survey (NHANES), 2011-2018. Race and ethnicity in NHANES is determined by self-identification, non-Asian designation includes Mexican American; non-Hispanic White, Black, and 'other' including multi-racial identities. Demographics included 19,336 total non-pregnant adults (Asian, n=2456, 12.70% and non-Asian, n=16880, 87.30%). Receiver operator curves and area under curve (AUC) analyses for Asian and non-Asian populations were also determined to estimate an appropriate cut-off point for T2D screening based on WHtR, and to compare sensitivity and specificity of BMI and WHtR. Linear regression analyses were conducted on the prevalence of diabetes and abdominal obesity. Diabetes was defined by A1c ≥ 6.5%, or if they reported taking oral medication or insulin to control blood sugar. Predictiveness of BMI and WHtR was established by AUC > .7. Significance level was set at $P < .05$.

Results

Results indicated an increased sensitivity for WHtR relative to BMI in identifying participants with T2D in all adults (AUC .718 in WHtR vs .663 in BMI). Difference in AUC value was statistically significant (Chi-Square = 632.17, $P < .001$), indicating WHtR is a more sensitive screening tool than BMI. Difference between WHtR AUCs in both groups was not significant (Chi-Square = 0.31, $P = .577$).

Conclusions

Identifying and applying screening tools with improved sensitivity increases the ability of primary care providers to capture populations with undiagnosed T2D, resulting in improved outcomes with earlier intervention for T2D. Further analyses should be conducted to determine if WHtR is a better screening tool for other chronic conditions, and to establish WHtR cut-off points.

Insights into Caregivers' Attitudes Concerning the Gardasil 9® Vaccine Series in the Sebastian County Region

Marya Ali (OMS-III)[1], Olivia Bellomo (OMS-II)[1], Hitomi Chilcutt (OMS-II)[1]*, Lily Fox (OMS-II)[1], Victoria Furfey (OMS-II)[1], Allen Hanna (OMS-II)[1], Megan Herrold, PhD (OMS-III)[1]*, Hannah Norwood (OMS-II)[1]*, Cindy Fuller, PhD[1]

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Human papillomavirus (HPV) remains one of the most common infectious diseases, affecting nearly 42 million Americans due to its spread by intimate contact. Although most infections are cleared, certain HPV strains are associated with development of squamous cell carcinoma and adenocarcinoma, including cervical, oropharyngeal, anal, and penile cancers. The HPV vaccine, Gardasil 9®, targets the most commonly oncogenic HPV strains, and thus can prevent over 90% of HPV-related cancers. A study comparing the four years before and after Gardasil's introduction in 2006 demonstrated a 29% decrease in cervical cancer rates. Only 5.5-11% of cervical cancer is not associated with HPV infection. Despite the clear health benefits of vaccination, stigma against the HPV vaccine persists and remains a particular problem in the state of Arkansas, where the age-adjusted incidence rate of cervical cancer is 9.5 cases per 100,000 people. In Sebastian County, the age-adjusted incidence rate of cervical cancer is 13.2 cases per 100,000 people, and cervical cancer rates have increased over 3.2% in the last 5 years. Currently, only 43.7% of adolescents, age 11-14, were vaccinated against HPV in Sebastian County as of September 9, 2024. To identify factors associated with the low vaccination rate in our region, ARCOM student doctors collected parental or guardian responses to a series of nine nationally validated survey questions approved by the ACHE Internal Review Board at a variety of ACHE-sponsored events in Sebastian County and surrounding regions. Consenting participants submitted surveys anonymously. Results from sixty surveys were tallied and graphed. Most respondents agreed or strongly agreed on the importance and effectiveness of the HPV vaccine for their children. Approximately 70% of respondents agreed or strongly agreed that they were planning to vaccinate their children. However, only 40% of those who took the survey agreed or strongly agreed that their PCP recommended that their child receive the HPV vaccine. We then compared answers to pairs of survey questions. More respondents reported planning to vaccinate or had already vaccinated their children when their physician recommended the HPV vaccine. Parents who believed that the vaccine information they received was reliable were more likely to believe the vaccine was effective. In conclusion, our team found that caregiver-perception of provider recommendation of the Gardasil 9® vaccine plays a key role in decisions to vaccinate their children.

Molecular binding of Drp1 inhibitors to induce non-apoptotic cell death in cancer cells

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[2] Department of Pharmaceutical Sciences, University of Arkansas for Medical Sciences

When approaching cancer chemotherapies, many current treatments focus on attacking cancer cells in an apoptotic pathway. The emergence of resistance to these historically successful drugs by tumor cells has led to a need for alternate therapies that target cell death in a non-apoptotic pathway. Of note, the regulators of cellular metabolism and mitochondrial dynamics are promising.

Proteins such as dynamin-related protein 1 (Drp1) are upregulated in cancerous cells, known to change mitochondrial dynamics and overall cellular metabolism to favor proliferation and a cancerous environment. This molecule has been the target of our molecular binding and cytotoxic assays with our novel small molecule inhibitor class of thienopyridine (TPH). Three compounds showing promising characteristics were selected and named TPH104C, TPH104M, and TPH104-32.

In depth docking studies were performed using Autodock software to determine their binding confirmations and a unities to Drp1 using human Drp1 crystal structure (PDB code 4H1V). The docking results and analysis show that the TPH compounds tested all have significant binding with the Drp1 protein based on their respective binding energies and hydrogen bond formation patterns. Overall resulting binding energies for each tested drug molecule are as follows; TPH104C: -8.34 kcal/mol, TPH104M: -8.55 kcal/mol, TPH104-32: -8.31 kcal/mol. These results are being further analyzed for the binding and stability of the ligand-protein complex with the help of Molecular Dynamics (MD) simulations using GROMACS. Continued testing in cytotoxic MTT assays was then performed to verify the effectiveness of these compounds in vitro. The selected cancer cell line, MIA PaCa-2 (pancreatic cancer), was harvested, seeded in a 96 well plate and treated with various concentrations of our TPH derivatives for 72 hours. Cell killing was then measured via MTT assay to determine the IC50 values. These experiments yielded an average IC50 value as follows; TPH104C: 4.845 μM, TPH 104M: 4.732 μM, TPH104-32: 0.706 μM. Of note, TPH104-32 was found to have a considerably lower IC50 value showing promise for future development. These initial cytotoxic MTT assays have supported the proposed mechanism that inhibiting Drp1 leads to non-apoptotic cell death. Cells treated with these TPH derivatives were observed to be rounded and swollen, rather than showing characteristic apoptotic blebs. With further studies, the role of Drp1 inhibition in non-apoptotic cell death will allow for better optimization of the compound for future development as a promising anticancer agent. Overall, the performed studies support TPH and its derivatives as a non-apoptotic method of inducing cell death in cancer cells via binding of the Drp1 mitochondrial protein. Further analysis of other derivatives and additional cytotoxic MTT studies should be performed to test other derivatives as well as further elucidate Drp1's role in cell killing.

Clostridium Septicum Necrotizing Fasciitis Leading to Disseminated Intravascular Coagulation, Septic Shock, and Death: A Case Report

Almyasheva A[1], Hadid M, Khan S, Tabe A, Burgess M

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Early identification and surgical debridement of necrotizing fasciitis from *Clostridium septicum* is vital for increasing chances of survival. *Clostridium septicum* is one of the more common Clostridium strains involved in spontaneous gas-forming necrotizing fasciitis or after soft tissue trauma.

A 64-year-old female was transferred to our facility for suspected acute coronary syndrome (ACS). On admission, she was complaining of left upper extremity (LUE) pain that was initially attributed to her cardiac complaints; however, within a couple of hours, she started having decreased sensation, strength, and range of motion of the wrist and hand. She lost radial and ulnar pulses on the left side and had severe tenderness to her forearm. She had a 1.5 cm laceration to her proximal, posterior left upper extremity and large ecchymosis to her back from a fall two days prior. At that point in the morning, she had no other overlying skin changes. Orthopedic surgery (Ortho) was consulted to rule out compartment syndrome. The patient was immediately started on broad spectrum antibiotics. Ortho determined her symptoms were not consistent with compartment syndrome but noted the patient developed ecchymosis and lost sensation to her forearm. Throughout the morning, the patient was noted to have rapidly-forming, bloodfilled bullae and worsening ecchymosis to her LUE.

Ultrasound of the LUE showed mobile echogenicity in the radial vein, thought to represent air, as well as thrombus to the subclavian vein. X-Ray LUE showed diffuse gas tracking. The antibiotic regimen was promptly modified to include anaerobic coverage. The patient was then sent for surgical debridement. She was found to have extensive infection extending into the torso, resulting in amputation of the LUE. During surgery, the patient developed disseminated intravascular coagulation (DIC). She was unable to go for further debridement due to worsening DIC and septic shock. On the second day of admission, the decision was made by the patient's family to allow the patient to pass peacefully on comfort care. Cultures from the debridement later revealed *clostridium septicum*.

Necrotizing fasciitis is an uncommon soft tissue infection involving the fascia. Rapid identification of necrotizing fasciitis and early surgical debridement along with broad spectrum antibiotic is essential to increasing survival in patients with this infection. The diagnosis of necrotizing fasciitis should be made by clinical exam, including rapidly expanding erythema, sometimes with skin color changes and bullae, crepitus, and severe pain often described as "out of proportion with exam." In later stages, the area has anesthesia, as in our patient, due to small blood vessel thrombus and nerve destruction.

Multiple different organisms can be found in necrotizing fasciitis, Clostridium species and Group A Streptotococcus are two of the most common bacteria identified in tissue cultures. Clostridium necrotizing infections are often associated with traumatic injuries. Our patient did have a fall two days prior to her admission, at which time she sustained a laceration to her LUE. We suspect this was the likely sight of inoculation. When Clostridium species are identified in culture, it is always considered part of a mixed bacterial infection. Keeping necrotizing fasciitis on the differential of any skin and soft tissue complaint, especially in the context of sensory and vascular changes, is imperative to decreasing mortality.

From Suspicion of Transient ischemic attack to the Diagnosis of CADASIL in a patient presenting with confusion.

Muhammad G. Arnous MD[1], Kiran Goushika MD[1], Muhammad Usman MD[1], Sujan Reddy[2] MD

[1]Mercy Hospital Fort Smith
[2]Mercy Hospital St. Louis

Introduction

CADASIL (Cerebral Autosomal Dominant Arteriopathy with Subcortical Infarcts and Leukoencephalopathy) is a hereditary small vessel disease caused by NOTCH3 mutations. It manifests with migraines, recurrent strokes, cognitive decline, and psychiatric symptoms. Neuroimaging typically reveals white matter hyperintensities, particularly in the anterior temporal lobes, which are diagnostic hallmarks. This report highlights the case of a 58-year-old woman with progressive cognitive and functional decline, ultimately diagnosed with CADASIL through characteristic MRI findings and genetic confirmation, emphasizing the importance of identifying rare genetic causes in atypical stroke presentations.

Case Presentation

A 58-year-old white female living in a homeless shelter presented to the ED with progressive confusion, memory loss, slow cognition, somnolence, gait disturbances, urinary and fecal incontinence, and decreased ADLs. Her history included tobacco use, hypertension, and pseudodementia due to major depressive disorder. Neurological examination revealed an apathetic affect but otherwise intact cranial nerves, reflexes, motor, and sensory functions.

Initial workup, including chest X-ray, CBC, CMP, drug screen, urinalysis, and HIV/syphilis testing, was unremarkable. Vitamin D, B12, TSH, and folate were normal. CT of the head showed diffuse periventricular white matter disease. MRI revealed extensive periventricular white matter disease with sparing of U fibers, bilateral anterior temporal lobe involvement, subacute infarcts in the left hemisphere, and Wallerian degeneration of the brainstem. These findings raised suspicion for CADASIL, confirmed by genetic testing, which identified a NOTCH3 mutation. An EEG demonstrated generalized slowing, consistent with mild global cerebral dysfunction. Stroke workup, including cardiac monitoring, echocardiogram, and CTA of the head and neck, was negative. Despite outpatient neurological follow-up, her memory and functional status continued to decline.

Discussion

This case highlights the diagnostic significance of CADASIL's clinical, imaging, and genetic features. Early identification enables tailored management, including controlling vascular risk factors and avoiding anticoagulants. Timely diagnosis also facilitates family screening, allowing at-risk relatives to receive early counseling and monitoring. Although no cure exists, symptom-focused care can improve quality of life and prevent unnecessary interventions.
The patient's progressive decline despite appropriate follow-up underscores the chronic nature of CADASIL and the need for ongoing support. Increased clinician awareness of its distinctive features such as anterior temporal lobe involvement and sparing of U fibers can reduce diagnostic delays, optimize care, and address challenges posed by this rare hereditary condition.

Unexpected Consequences: A Rare Mycotic Pseudoaneurysm After Salmonella Gastroenteritis

Muhammad G. Arnous MD[1], Saloni Shirke MD[1], Shreya Sukralia MBBS[1], Kevin Davis MD[1], Mohankumar Doraiswamy MD[1]

[1]Mercy Hospital

Introduction

Mycotic aneurysms/pseudoaneurysm are vascular infections characterized by presence of microorganisms within the arterial wall often leading to aneurysmal formation. Gram positive bacteria including Staphylococci and Enterococci are the most common. Gram-negative bacteria, such as Salmonella, can also be implicated. Risk factors for mycotic aneurysms include previous trauma, surgical interventions, and underlying comorbidities such as immunosuppression or vascular disease. Early recognition and management are crucial to prevent serious complications associated with this condition.

Case Presentation

An 81-year-old Caucasian female with a history of bilateral carotid endarterectomy (CEA) and Dacron patch angioplasty 20 years prior presented with progressive left neck swelling, pain, fever, and chills over two weeks. She had also experienced a two-week period of non-bloody, yellowish diarrhea six weeks before these symptoms, which had not improved despite a course of azithromycin prescribed by her primary care provider. She reported a 58-pack-year smoking history, denied alcohol or drug use, and lived on a chicken farm, raising concerns of zoonotic exposure.

A neck CT revealed a large (3.3 cm) clotted aneurysm/pseudoaneurysm arising from the left internal carotid artery. Vascular surgery was consulted, and she underwent exploration of the left carotid artery, resection of the pseudoaneurysm, endarterectomy, removal of the Dacron patch, and repair with a pericardial patch. Postoperatively, she developed dysphagia and stridor from pharyngeal and tracheal traction caused by post-surgical edema. A follow-up CT showed no fluid collection. Cultures from the lesion drainage grew Salmonella enterica, which was susceptible to ampicillin. Blood cultures and transthoracic echocardiogram were negative. She received intravenous ampicillin, with clinical improvement.

Discussion

This case underscores the rare development of a mycotic pseudoaneurysm following Salmonella enterica-related gastroenteritis, illustrating the uncommon transition from gastrointestinal infection to vascular complication. Her farming background suggested possible zoonotic exposure, aligning with her Salmonella infection. Though Dacron patches are frequently used in CEA, studies show that both bovine pericardial and Dacron patch angioplasty offer superior long-term protection against restenosis compared to primary closure. Carotid patch infections remain rare, with an incidence below 1%. Suggested management strategies for infected CEA patches include patch excision with autogenous or prosthetic reconstruction, debridement, myo-cutaneous flap coverage, intraluminal stenting, and ligation, though no consensus exists on the optimal approach. This case highlights the importance of considering atypical infectious presentations in patients with vascular grafts.

A diagnostic challenge in a young patient presenting with recurrent episodes of inflammatory episodes and history of myelodysplastic syndrome

Muhammad G. Arnous, MD[1], Muhammad Usman MD[1], Kevin Davis MD[1]

[1]Mercy Hospital Fort Smith

Introduction:
Sweet syndrome, or acute febrile neutrophilic dermatosis, is a rare inflammatory condition characterized by painful, erythematous plaques, nodules, or papules, often involving the face, neck, trunk, or upper extremities. It is frequently associated with systemic symptoms such as fever and arthralgia. Diagnosis is clinical, confirmed by histological findings of dermal neutrophilic infiltrates. In hematological disorders like myelodysplastic syndrome (MDS), atypical mononuclear cells may be present. Systemic corticosteroids are the first-line treatment, typically providing rapid symptom relief.

Case Presentation:
A 19-year-old male with MDS, aplastic anemia, pericarditis, cellulitis, pancreatitis, and iron overload presented with progressive facial swelling over two days. Initially treated for cellulitis with antihistamines, morphine, and antibiotics, his swelling, particularly around the left eye and lip, worsened. CT imaging revealed soft tissue swelling in the upper lip consistent with cellulitis.

The patient had a history of recurrent inflammatory episodes, including abscesses requiring drainage and multiple hospitalizations. Similar prior episodes failed to improve with antibiotics but responded to corticosteroids, with recurrence upon steroid discontinuation resolving when steroids were restarted. On admission, the patient was febrile, tachycardic, and pale, with hemoglobin of 6.2 g/dL, requiring transfusion. Laboratory findings showed leukopenia, thrombocytopenia, elevated CRP and ESR, and mild liver enzyme abnormalities. A bone marrow biopsy had previously demonstrated acellular marrow with trisomy 8. Iron overload due to chronic transfusions was managed with chelation therapy. During his hospital stay, acute kidney injury likely caused by antibiotic-associated tubular necrosis improved with hydration. Based on his presentation, history, and lack of response to antibiotics, Sweet syndrome was suspected. Initiating systemic corticosteroids led to rapid improvement, and antibiotics were continued to address potential secondary infection.

Discussion:
This case highlights the importance of recognizing Sweet syndrome, especially in patients with hematological disorders like MDS. Its presentation often mimics infectious conditions, as seen in this patient’s recurrent skin inflammation. However, the failure to improve with antibiotics and prompt response to corticosteroids are key diagnostic features.

Timely diagnosis of Sweet syndrome avoids unnecessary treatments and reduces morbidity. Awareness of the patient’s history of steroid-responsive episodes facilitated appropriate management. This case underscores the need to consider Sweet syndrome in patients with recurrent skin manifestations and underlying hematological conditions.

Paraneoplastic Limbic Encephalitis Without Identified Malignancy: A Diagnostic and Therapeutic Challenge

Muhammad G. Arnous MD[1], Muhammad Usman MD[1], Dilbag Kaur MD[1], Arpana Ashok MD[1], Sujan Reddy MD[2]

[1]Mercy Hospital Fort Smith
[2]Mercy Hospital St. Louis

Introduction

Paraneoplastic limbic encephalitis (PLE) is a rare autoimmune disorder linked to neuronal antibodies, often associated with small cell lung or breast cancer. Anti-Hu and anti-amphiphysin antibodies are frequent markers. PLE presents with subacute cognitive decline, psychiatric symptoms, seizures, and movement disorders. The absence of an identifiable malignancy complicates diagnosis and management, as tumor-directed therapy is often pivotal. This case illustrates the challenges of treating PLE without a detectable tumor.

Case Presentation

A 54-year-old Caucasian female with bipolar disorder, depression, COPD, and a 20-pack-year smoking history presented with right arm myoclonus, left ophthalmoparesis, ataxia, bilateral leg weakness, and urinary retention. She was previously treated for presumed encephalitis versus Miller-Fisher variant with steroids and IVIG, achieving partial improvement.
Readmission exam revealed myoclonus, leg scissoring, saccadic eye movements with rotary nystagmus, and hyporeflexia. MRI showed stable bilateral insular hyperintensities. EEG and CSF were unremarkable except for positive HHV-6. Anti-Hu1 and anti-amphiphysin antibodies were detected. CT chest showed a borderline hilar node, confirmed benign.
Despite IVIG and rituximab, symptoms worsened. ICU admission followed respiratory failure from a urinary tract infection. EEG revealed seizures managed with antiseizure medications. Plasmapheresis yielded minimal benefit. Bronchoscopy identified a small endobronchial nodule, but biopsy was deferred due to risks. Extensive malignancy workup, including colonoscopy and full-body imaging, was negative. With continued clinical decline despite multimodal therapy, care transitioned to comfort measures.

Discussion

This case highlights the diagnostic and therapeutic difficulties of PLE without an identified malignancy. Anti-Hu and anti-amphiphysin antibodies strongly suggest paraneoplastic etiology, often linked to small cell lung cancer. However, no malignancy was detected despite extensive evaluation. The HHV-6 finding likely reflects an incidental, unrelated finding.
Refractory symptoms despite steroids, IVIG, rituximab, and plasmapheresis underscore the limited efficacy of immunotherapy in PLE without tumor treatment. Advanced diagnostics, such as PET imaging or molecular testing, may improve malignancy detection. This case emphasizes the importance of ongoing cancer surveillance and palliative care for managing refractory symptoms in PLE.

Unexpected Crisis: Azathioprine-Induced hypersensitivity syndrome with multi-organ dysfunction in the Treatment of Mucous Membrane Pemphigoid.

Muhammad G. Arnous MD[1], Muhammad Usman MD[1], Mohankumar Doraiswamy MD[1]

[1]Mercy Hospital Fort Smith

Introduction:
Azathioprine, an immunosuppressant used in autoimmune conditions like pemphigus vulgaris and inflammatory bowel diseases, suppresses immune activity but carries the risk of severe adverse effects, including rare cases of septic shock and multi-organ dysfunction. These reactions, though less than 1% of cases, highlight the importance of monitoring patients closely during the initial weeks of therapy. Management typically involves discontinuation of azathioprine, supportive ICU care, and early intervention to prevent severe outcomes.

Case Presentation:
A 68-year-old woman with hypertension and ischemic optic neuropathy was diagnosed with pemphigus vulgaris and started on azathioprine. Two weeks after beginning treatment, she presented with acute abdominal pain, nausea, vomiting, loose stools, and dizziness. Abdominal CT showed duodenitis and enteritis, initially managed conservatively. However, her symptoms worsened, and repeat imaging revealed gastroenteritis, fever, hypotension, elevated lactic acid (2.8 mmol/L), transaminitis, and CRP. She was diagnosed with septic shock, started on a sepsis bundle, and admitted to the ICU. Despite negative infection workups, she required low-dose norepinephrine. Azathioprine was discontinued, and her condition improved within 48 hours. Two weeks later, after resuming azathioprine per her rheumatologist's recommendation, she presented again with shock-like symptoms, requiring vasopressors despite negative infectious workups. Abdominal imaging remained stable. After discontinuing azathioprine, her symptoms improved, and an EGD revealed chronic active inflammation. She was advised to permanently discontinue azathioprine, up till now no further shock-like episodes have occurred.

Discussion:
This case highlights the rare but severe complication of azathioprine-induced septic shock. The recurrence of symptoms upon re-exposure to azathioprine strongly suggests a causal relationship, especially in the absence of infection. Discontinuing azathioprine and providing supportive ICU care, including fluids and vasopressors, led to resolution of symptoms. This emphasizes the critical need for vigilant monitoring in patients on azathioprine, especially in the first few weeks of therapy. Early detection and intervention are essential for mitigating serious complications and improving patient outcomes. This case underscores the importance of weighing the risks of immunosuppressive therapy against the potential for serious adverse effects and the need for careful infection surveillance.

A Case Study of the Gross Appearance of the Co-occurrence of Chronic Myelogenous Leukemia and Graft Versus Host Disease in a Cadaveric Donor

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Chronic Myelogenous Leukemia (CML) is a type of cancer that causes overproduction of blood cells. It is sometimes treated using allogeneic Hematopoietic Stem Cell Transplant (allo-HSCT), which replaces stem cells that have been damaged with healthy, blood-forming donor cells. Allo-HSCT is a common treatment for CML, but its use is associated with several complications, notably the development of Graft vs Host Disease (GVHD) in up to 50% of patients. GVHD is a complex systemic disorder that occurs when immune cells from transplanted tissue, such as bone marrow, recognize antigens in the transplant recipient's tissue as foreign. GVHD predominantly manifests as cutaneous, gastrointestinal, and liver damage, but may also damage other organs. While there are known risks inherent with the treatment, its use continues because it is still considered the treatment of choice for patients with advanced-stage CML or patients that are resistant to certain types of cell-growth blockers such as Tyrosine Kinase Inhibitors (TKI's).

Given the critical role of allo-HSCT in CML treatment and the potential for GVHD, it is essential to further study the effects of this treatment on cadaveric donors, as there is currently a lack of research documenting the occurrence of CML and GVHD in this population. Here, we present the case of a 43-year-old male donor from the Arkansas Colleges of Health Education (ACHE) with a documented medical history of Chronic Myelogenous Leukemia and Graft vs Host Disease, allowing us to confirm the co-occurrence of these conditions and document them together in a single individual. During routine cadaveric dissection, pathologies were observed in the greater omentum, liver, and spleen, demonstrating the widespread effects of CML and GVHD in the abdomen.

Photographs were taken with a scale bar to document the gross appearance of the pathological abdominal viscera. All measurements were recorded in millimeters and were taken approximately every 2 cm along the greater omentum, starting from the greater curvature of the stomach to the inferior border of the omentum. The length and width of multiple adhesions between the greater omentum, spleen, and vermiform appendix were also recorded as evidence of previous inflammation in these areas.

This study documented the abdominal viscera of a donor with GVHD and CML, providing valuable insights into the gross presentation of the co-occurrence of these diseases in a cadaveric donor. By documenting these findings, we aim to enhance our understanding of the pathological presentations of GVHD and CML, contributing to the broader knowledge of how these conditions manifest in the human body. We hope this study will help inform future clinical research and improve diagnostic practices.

Neuron-specific glycine metabolism links tRNA epitranscriptomic regulation to complex behaviors

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The presence of treatment-resistance in neuropsychiatric disease suggests that novel mechanism-based discoveries and therapies could benefit the field, with a viable candidate being tRNA epitranscriptomics. Nsun2 tRNA methyltransferase depletion in mature neurons elicits an antidepressant-like phenotype. However, it remains unclear whether this is due to dysregulated tRNAs or metabolic shifts that impact the neuronal translatome by activation of stress messengers together with alterations in amino acid supply. To link specific molecular alterations resulting from neuronal Nsun2 ablation to an antidepressant-like phenotype, we employed drug-induced phospho-activation of stress-response translation initiation factors together with disruption of Nsun2-regulated glycine tRNAs and cell-type specific ablation of the glycine cleavage system modeling the excessive up-regulation of this amino acid in the Nsun2-deficient brain. Changes in extracellular glycine levels were monitored by an optical glycine FRET sensor in the hippocampus and behavioral phenotyping included cognition, anxiety-like behavior, and behavioral despair. Antidepressant-like phenotypes including increased motivational escape behaviors were specifically observed in mice with neuron-specific ablation of Gldc glycine decarboxylase resulting in an excess in cortical glycine levels comparable to a similar phenotype in mice after deletion of neuronal Nsun2. None of these phenotypes were observed in mice treated with tunicamycin for chemoactivation of integrative stress response pathways or in mice genetically engineered for decreased glycine tRNA gene dosage. In the Nsun2-deficient brain, dynamic glycine profiles in the hippocampal extracellular space were fully maintained at baseline and in context of neuronal activity. We show that dysregulation of the tRNA regulome can have profound effects on cognition and complex behavior, using three different molecular interventions. However, only a single factor was linked to antidepressant-like phenotypes: upregulation of neuronal glycine elicited by disruption of the GCS's rate limiting enzyme, GLDC. we have demonstrated through rigorous methodologies that while multiple molecular signatures are at play following dysregulation of the tRNA epitransriptome, neuronal glycine metabolism is the most likely mechanism governing changes to complex behaviors relating to neuropsychiatric disease.

Purification and Characterization of Listeriolysin O

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Bacteria utilize a variety of mechanisms to facilitate host colonization and disease. The bacterial arsenal is complex and varied, and often includes secreted protein toxins. Bacterial toxins are diverse and have evolved to target a wide array of eukaryotic structures. One of the largest families of bacterial toxins are the cholesterol dependent cytolysin (CDC) family of pore forming toxins. Numerous organisms produce CDC family toxins including pathogenic members of the Clostridium, Listeria and Streptococcus. The archetype member of the CDC family of protein toxins is perfringolysin O (PFO) which is produced by Clostridium perfringens, an anaerobic bacterium that causes gangrene and gastrointestinal disease. Studies using PFO have identified that CDC pore formation is a stepwise process whereby soluble monomers bind to susceptible membranes, undergo oligomerization, and form a stable pre-pore before collapsing into the membrane. However, molecular interactions necessary for stable pore formation in PFO are absent in other members including listeriolysin O (LLO), a principal virulence factor produced by Listeria monocytogenes and causative agent of Listeriosis. Listeriosis is associated with gastrointestinal distress and is a special concern for women who are pregnant and the immunocompromised as it may cause birth defects, fetal demise, and complex meningitis. LLO has a unique ability to sense pH. The toxin is stable at low pH (pH < 5.5) and aggregate prone at neutral pH. However, the molecular mechanisms of LLO pH sensing are poorly understood. Our long-term goal is to characterize the mechanism of LLO pH sensing. To do this we have adapted a recombinant Escherichia coli expression system that allows us to recombinantly express wild type and mutated LLO variants. We then assessed the hemolytic properties of the variants and compared them to other CDC family members including PFO. Herein we describe our protein purification strategy and assess the contributions of selected LLO variants and the impact these variants have on LLO pH sensing and pore formation. These studies have established essential protocols necessary for the study of CDC pore formation generally, and the characterization of unique molecular interactions utilized by LLO specifically. These studies will additionally aid in the development of future vaccine platforms and biotechnology applications.

Liquid Probiotic Delivery Validation

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Probiotics are live microorganisms with claims of benefits for the human body, particularly in the gut microbiome, upon consumption. There has been little research done on the topic, and of that, most of the results have been small and inconclusive. Prior to beginning this project, we noticed a gap in experimentally backed data on liquid probiotics. The purpose of this study is to narrow that gap and validate the delivery of liquid probiotics. This is an ongoing project in which we have been gathering plate counts from a variety of dilutions of three different liquid probiotic supplements: SCD Essential Probiotics, Parent's Choice Probiotic Supplement, and Mary Ruth's Organic Liquid Probiotic. To determine the environment in which these probiotics grow best, we have been adjusting multiple factors, such as broth temperature and incubation time, and documenting the outcome for each. Although our results are still inconclusive, we have gotten better results upon incubating our liquids in a peptone broth for 24 hours prior to plating as opposed to adding the liquids to the peptone broth and plating immediately. We plan to continue testing this factor and expand our research by testing various environmental factors, such as temperature, enzymes, and pH, to simulate different areas of the gastrointestinal tract.

Klebsiella pneumoniae and Invasive Liver Abscess Syndrome: A Clinical Insight

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Invasive Liver Abscess Syndrome (ILAS) represents a rare infection first identified in the 1980's by researchers in Taiwan as a distinctive condition due to monomicrobial Klebsiella pneumoniae infection. Most cases have since presented in Taiwan and surrounding countries in patients of Asian descent; however, reports indicate increasing prevalence in North America among patients of varying race. Several studies have defined ILAS as a K. pneumoniae liver abscess which occurs in the absence of hepatobiliary disease. In a minority of patients, ILAS is complicated by metastatic infection in addition to primary liver abscess. Extrahepatic manifestations include but are not limited to meningitis, endophthalmitis, lung abscess, pleural effusion, and abdominal/pelvic organ abscess. This case report aims to present the case of a patient who developed severe K. pneumoniae infection and subsequent ILAS. We hypothesize that the patient's comorbidities of Hypertension and Type 2 Diabetes made him vulnerable to ILAS development.

The patient is a 70-year-old male with a medical history significant for Hypertension, Coronary Artery Disease, and Type 2 Diabetes who presented to the emergency department with right upper quadrant and lower right chest pain lasting 2-3 days. Initial findings indicated leukocytosis and urinalysis suggestive of a urinary tract infection. CT scans of the abdomen and pelvis with contrast revealed a 3.9 cm cyst/abscess adjacent to the right kidney and liver, a small amount of perihepatic fluid suspicious for an abscess, and a right sided pleural effusion. The patient was initially treated with broad-spectrum antibiotics. He underwent CT-guided drainage of the right renal abscess, with subsequent follow-up via CT abscessogram. While the renal abscess resolved, there was persistent communication with the liver capsule, necessitating drainage of a large subcapsular liver collection. Cultures from intra-abdominal and urine specimens tested positive for Klebsiella pneumoniae. An MRI of the lumbar spine, with and without contrast, revealed an unusual right-sided paraspinal muscle mass suspected to be an abscess. Antibiotic therapy was adjusted to levofloxacin based on culture results, and the patient showed clinical improvement throughout hospitalization.

Studies indicate Diabetes and Hypertension to be the most frequent comorbidities among patients who develop ILAS. These conditions impair host defenses allowing for K. pneumoniae infection in a variety of sites. While prognosis for ILAS is generally good, metastatic complications can cause substantial morbidity. Our index patient developed metastatic infection with right pleural effusion, renal abscess, and paraspinal abscess severely complicating the patient's condition. With K. pneumoniae being one of the leading bacterial causes of liver abscess and emerging evidence of ILAS cases in the United States, health care professionals should be educated on the syndrome for optimal management.

Pollution Diffusion: A Look at Arkansas River Valley's Watersheds

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Water quality plays a crucial role in safeguarding public health, preserving ecosystem functions, and fostering sustainable economic growth. As the population of Arkansas grows, there is a concurrent increase of land use for industry, agriculture, and residential functions. These land-use shifts have potential impacts on waterways that may impact overall water quality. Water runoff from these altered sites may have a detrimental effect on water quality. We set out to build a data set of water quality parameters to model how altered land use will impact water quality in Arkansas River Valley. Water samples were collected from various localities in the following Arkansas counties: Washington, Crawford, Sebastian, and Franklin. Each site was assessed for turbidity, chemical oxygen demand (COD), nitrate, and phosphorous. To date, we have collected samples from over 30 sites in the Arkansas River Valley. All locality and water quality data that is collected will be used by the Computer Science program at UAFS to generate a model to predict how land use will impact water quality.

Case Report of Diverticulosis and Suspected Secondary Condition of Epiploic Appendagitis in a Cohort of Anatomical Donors

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Diverticulosis is a condition that is often asymptomatic and thus hard to detect. It is caused when the diverticula in the vasa recta become separated from the intestinal lumen, leaving the affected area more susceptible to damage. If left untreated, inflammation caused by diverticulosis can spread through the serosa, causing a secondary condition called epiploic appendagitis (EA). Appendages are small, fat-filled pouches that can be found throughout the colon, but are more abundant in the transverse and sigmoid colon. EA occurs when intestinal torsion leads to ischemic infarction—tissue death due to inadequate oxygen supply caused by obstruction—in the appendage, resulting in its shortening. EA typically presents as acute abdominal pain and is often misdiagnosed due to the lack of information regarding its gross presentation. Since the condition presents similarly to other conditions like diverticulitis, appendicitis, or cholecystitis, patients may undergo unnecessary diagnostic tests and treatments.

Here we present a case study of a donor with a documented medical history of diverticulosis, which resulted in a suspected secondary complication of EA. In this study, we compare the difference in appendage length between a donor with documented diverticulosis (n=1) and non-pathological donors (n=5) from the same cohort at the Arkansas Colleges of Health Education (ACHE). Specifically, we measured epiploic appendages of one pathological donor and epiploic appendages from five non-pathological individuals as controls. Each individual donor had five appendages measured from the sigmoid colon. All measurements were recorded in millimeters. Photographs with a scale bar for reference were taken to document the gross appearance of the pathologies.

Results of this study showed that the epiploic appendages of the donor with diverticulosis were shorter compared to those in donors used as the control. The epiploic appendages in the pathological donor measured 15.24 mm in length and 3.04 mm in width, while those in the control group averaged 21.36 mm in length and 3.57 mm in width. The results align with previous cases that have also reported shorter appendages in individuals with EA compared to those without the condition.

Due to a lack of awareness about EA, this condition is often misdiagnosed. Since EA presents similarly to other conditions like diverticulitis, appendicitis, or cholecystitis, patients may undergo unnecessary diagnostic tests and treatments.This study aims to raise awareness of EA to ultimately reduce the need for invasive procedures and improve outcomes for those affected by the condition. This study aims to raise awareness and help prevent the progression of EA, ultimately reducing the need for invasive procedures and improving outcomes for those affected by the condition.

Case Presentation: Underlying Pathology, Clinical Manifestations, and Management of Imported Fire Ant Stings

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Fire ant stings, caused by an imported species (Solenopsis Invicta and Solenopsis Richteri) from South America, are a common allergic hazard in the Southern United States. Immediately presenting as red papules that progress to sterile pustules within 24 hours, they are common causes of local cutaneous reactions as a direct result of the toxin. In the following 24 hours, these can occasionally expand to larger contiguous areas of edema, called large local reactions. These large local reactions, although involving IgE, rarely progress and the pathology is not fully elucidated. Roughly 3% of the population experiencing stings will develop a life-threatening allergic (anaphylactic) reaction. Anaphylaxis is a more severe type I IgE mediated hypersensitivity reaction leading to massive mast cell degranulation involving multiple organ systems. These reactions frequently include cardiovascular and pulmonary systems. We describe the case of a 50-year-old male, who presented to the clinic with pustules on his arms bilaterally due to fire ant stings. He was treated with intramuscular Ceftriaxone and Dexamethasone resulting in a subsequent vasovagal reaction leading to an ER visit. The presentation of the sterile pustules is frequently misdiagnosed as infection. Upon review, it appears the patient's diagnosis of infection, as indicated by the treatment, may not have aligned with the clinical presentation. We review the common presentations and their underlying pathology, evaluation of symptoms and treatment sequence for different fire ant sting presentations.

Unmasking a rare hepatobiliary enigma: A case of Rare Caroli disease presenting with Persistent Fever

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Introduction

Caroli disease is a rare congenital disorder characterized by segmental intrahepatic bile duct dilation, often leading to recurrent cholangitis, hepatolithiasis, and progressive hepatic fibrosis. The condition results from ductal plate malformations during embryonic development. While it is typically diagnosed in childhood or early adulthood, Caroli disease can present later in life with non-specific symptoms, complicating diagnosis. Imaging modalities such as ultrasound, CT, MRI, and hepatobiliary scintigraphy are vital in identifying hallmark features like bile duct dilatation and cystic changes. This case highlights the diagnostic challenges of Caroli disease in a patient with fever of unknown origin, stressing the importance of integrating clinical and radiological findings.

Case Presentation

A 38-year-old Hispanic male with no significant medical history presented with a 4-week history of high-grade fever, diaphoresis, mild headache, nausea, and vomiting. He had recently traveled to Mexico and reported consuming undercooked pork and getting a new tattoo. Physical examination revealed right upper quadrant tenderness, a positive Murphy sign, but no rebound tenderness or hepatosplenomegaly. His vital signs were stable, but he had a temperature of 103.2°F at presentation. Laboratory tests showed normal CBC, CMP, and urinalysis, but elevated CRP (214.2) and ESR (103). Infectious workup, including viral, respiratory, and tick panels, was negative. Initial treatment with ceftriaxone and doxycycline was initiated. Imaging revealed multiple hepatic cysts and intrahepatic ductal dilatation. CT and MRI confirmed Caroli disease, and hepatobiliary scintigraphy demonstrated delayed bile duct tracer excretion, further supporting the diagnosis. Previous records showed stable hepatic cysts and intrahepatic ductal dilatation at age 24, with biopsies diagnosing hepatic fibrosis. The patient improved with broad-spectrum antibiotics, suggesting infected cysts. The clinical presentation, imaging, and prior history confirmed Caroli disease.

Discussion

This case emphasizes the importance of recognizing Caroli disease as a potential cause of fever of unknown origin. Characteristic imaging findings, including hepatic cysts and intrahepatic ductal dilatation, confirmed the diagnosis, supported by the patient's previous history of hepatic fibrosis. The improvement with broad-spectrum antibiotics highlights the common association of Caroli disease with cyst infections. Early diagnosis is crucial for timely infection management and monitoring for complications such as cholangiocarcinoma or portal hypertension. Awareness of Caroli disease, especially in patients with recurrent hepatobiliary symptoms and consistent imaging, is key to optimizing care, preventing disease progression, and improving patient outcomes.

Exploring the Differences in Anatomical, Physiological, and Cognitive Attributes Across Humans and Chimpanzees: A Perspective of Genomic Analysis

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Background
This paper explores the genetic and epigenetic bases underlying the differences in anatomy, cognition, and social behavior between humans and chimpanzees. Despite sharing a close evolutionary relationship, these species exhibit significant disparities in brain structure, physical features, and behaviors, attributed to their genomic divergence. Key areas of interest include the expansion of the human prefrontal cortex, differences in gene expression patterns, and regulatory mechanisms such as transcriptional and epigenetic modifications, which may drive the phenotypic and behavioral distinctions between the two species.

Methods and Procedures
The study employs comparative genomic analysis between human and chimpanzee genomes, focusing on single nucleotide polymorphisms (SNPs), gene mutations, and chromosomal differences. Techniques include the analysis of specific genes like FOXP2 (linked to speech) and ASPM (related to brain size), examination of mitochondrial DNA (mtDNA) variations, and the study of human accelerated regions (HARs) that show rapid evolutionary changes in humans. Additional attention is given to examining structural elements like LINE1 and Alu sequences for insights into chromosomal rearrangements and their evolutionary implications.

Key Findings
Genomic Differences: Human and chimpanzee genomes differ by approximately 4%, encompassing around 35 million single nucleotide differences and multiple insertions/deletions.
Neocortex Development: Human prefrontal cortex expansion, associated with cognitive ability, results from the prolonged proliferative capacity of neural stem cell progenitors.
Regulatory Elements: HARs, particularly HAR1, are implicated in human brain development, with HAR1F and reelin genes showing coordinated expression in human cortical development.
Chromosomal Structure and Transposable Elements: LINE1 and Alu elements contribute to chromosomal inversions and rearrangements, creating phenotypic variations. Additionally, mtDNA variation supports the theory of maternal inheritance in evolutionary studies.
Unique Genes and Positive Selection: Genes like FOXP2, ASPM, and CMAH demonstrate positive selection, supporting adaptations related to speech, brain size, and pathogen resistance in humans.

Conclusion
The findings indicate that differences in gene regulation, particularly in non-coding regions and HARs, are central to the evolutionary divergence between humans and chimpanzees. These differences in gene expression and regulatory mechanisms, rather than mutations alone, primarily drive anatomical and cognitive distinctions. This study suggests that future research should focus on understanding how specific regulatory changes influence the structural and behavioral traits distinguishing humans from other primates.

Molar Down: A Topographical Erosion Study of Human Molars

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Dental topography allows for the quantitative measurement and graphical representation of a tooth's surface to directly compare aspects such as sharpness, wear, and other known dental patterns. For decades the main focus on dental topography research associating diet and geographical correlations has been centered on primates. Minimal data has been released on human samples, underscoring the necessity for a concentrated evaluation. This study uses first mandibular molar (M1) computed tomography (CT) data from archaeological (Alaska, n = 10; Australia, n = 10; Greenland, n = 11) and historical (United States, n = 10) populations to examine the relationships of tooth surface patterns between the right and left sides, males and females, and between populations. The R package molaR was used to calculate Dirichlet's Normal Energy (DNE; surface complexity), Relief Index (RFI; 3D surface area ratio to 2D area), Orientation Patch Count (OPCr; calculates the orientation of varying surfaces), and Slope (average cusp height), on the occlusal surface of each tooth. Statistics were analyzed using R to establish differences and relationships between populations across the measured variables. Paired t-tests showed no significant differences between individual left and right sides ($p > 0.05$) while t-tests showed no significant difference between sexes ($p > 0.05$). ANOVAs established a significant difference in DNE between Oceania and Alaska ($p = 0.24$) and the United States ($p = 0.03$). Additional significant differences were shown between Alaska and the United States for both RFI ($p = 0.004$) and Slope ($p = 0.002$). These results indicate that Oceanic populations have the most complex tooth surfaces in relation to the curvature of the surface (DNE), followed by Greenland, Alaska, and the US. However, Alaskan teeth showed the lowest relief (RFI) and cuspal height (Slope), followed by Greenland, Oceania, and the US. Previous research indicates that US populations have the least amount of tooth wear followed by Greenland, Oceania, and Alaska. These results support the dental sculpting hypothesis in that those populations with more wear, show larger changes on the topographic surface of the molar teeth - typically associated with sharper and more complex tooth surfaces. These results indicate that wear topography measurements can be used to evaluate geographical contrast between human populations. Preliminary data indicate it is essential to explore how topographical wear patterns in mandibular molars may correlate with dietary habits and geographic variation, providing further insights into the relationship between dental wear and environmental factors. This pilot study data will be used as part of an expanded study on all molar teeth (M1-M3) across all individuals in these four populations (n =364).

Improving Birth Control Counseling in a Primary Care Setting

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This study was performed in a family medicine resident continuity care clinic affiliated with a community hospital. The goal was to increase patient awareness and open opportunities for resident physicians to discuss birth control options with their patients and decide on an appropriate birth control methods that fits the patients' medical needs. The first step was collecting data on which patients were already on birth control. Family medicine residents in this clinic prescribe oral contraceptive pills, patches, rings, and depo injections. Data was collected from the EMR database to determine how many female patients ranging age 16-35 seen in the clinic from a 3-month window (May-July 2023) were currently prescribed these contraceptive methods. The data collection showed that 250 patients within this inclusion criteria were currently prescribed such methods. Once this data was collected, a patient information chart of birth control methods was displayed in each patient exam room of the continuity clinic. In addition, family medicine resident physicians attended a presentation discussing the role of birth control counseling in a primary care setting, review of the method chart, which birth control methods we can prescribe versus send referrals to OB/Gyn, and general information regarding each method and contraindications of certain methods was given. Data was then re-collected with the same inclusion group (females age 16-35) over another 3-month window (May-July 2024). It was decided to compare 3-month windows that were one year apart due to most young females generally having annual visits. The post-collection showed that 298 patients were now prescribed these birth control methods, indicating a 19.2% increase in birth control prescriptions. As before mentioned, the family medicine residents can only prescribe certain birth control methods so other methods such as Nexplanon, IUDs and sterilization were not included in the data this study but were included in discussions with patients as options for birth control so are un-accounted for in the data for comparison.

Olmesartan-Induced Enteritis in a 73-Year-Old Female: A Rare Cause of Chronic Diarrhea

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Introduction:
Olmesartan, an angiotensin II receptor blocker (ARB), is commonly prescribed for hypertension. While dizziness and hyperglycemia are typical side effects, olmesartan-induced enteritis is a rare but significant cause of chronic diarrhea, often mimicking celiac disease. Early diagnosis can be challenging due to nonspecific symptoms.

Case Presentation:
A 73-year-old Caucasian female presented with a 9-week history of intractable, non-bloody, watery diarrhea occurring 9–10 times daily, significant weight loss, and reduced appetite. She denied abdominal pain, nausea, vomiting, bloating, or fever. Family history was notable for celiac disease.

Previously treated for acute kidney injury with IV fluids at another hospital, her initial workup was incomplete. On admission, labs revealed leukocytosis (WBC 21,000), mild lactic acidosis, hypokalemia, hypomagnesemia, and elevated lipase (220 U/L). CT imaging showed small bowel loops consistent with enteritis. Stool studies were negative for pathogens. Further tests revealed 20% stool fat, low pancreatic elastase (59), negative celiac serologies, and normal colonoscopy findings. Biopsy results confirmed microscopic colitis. Given her recent initiation of olmesartan, the drug was identified as the likely cause.

Olmesartan was discontinued, and she was treated with rifaximin, cholestyramine, and a liquid diet. Following the discontinuation of olmesartan, the patient exhibited significant clinical improvement, with resolution of diarrhea, normalization of laboratory values, and progressive restoration of appetite and nutritional status.

Discussion:
Olmesartan-induced enteropathy, described in 2012, mimics celiac disease and inflammatory bowel disease, with chronic diarrhea, weight loss, and malabsorption. The mechanism may involve immune-mediated mucosal injury. Diagnosis is clinical, based on symptom improvement after discontinuing the drug.

This case highlights the importance of considering medication-induced enteropathies in patients with unexplained chronic diarrhea, particularly in older adults with recent medication changes. Prompt recognition and systematic evaluation can prevent unnecessary invasive procedures and facilitate recovery.

Conclusion:
Olmesartan-induced enteritis is a rare but reversible cause of chronic diarrhea. Clinicians must consider it in the differential diagnosis for patients on olmesartan. Discontinuation of the drug is essential for symptom resolution and improved outcomes.

Student Led CI Therapy Protocol Leads to Improvements in Upper Extremity Function

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Since its inception, multiple studies have demonstrated the positive effects of constraint induced (CI) therapy on adult post-stroke function. However, despite demonstrated efficacy, the delivery of CI therapy as standard practice remains limited. The purpose of this project was to pilot a student-led standardized CI therapy protocol to address barriers impacting service delivery and expand outcome measures of self-efficacy. High levels of self-efficacy, or the belief in one's own capabilities, have been shown to optimize learning and recovery post-stroke.

A case series was conducted with 3 patients who were at least 6 months post stroke who demonstrated residual deficits in upper extremity function. The intervention consisted of 30 hours of onsite therapy paired with a transfer package designed to promote adherence to the intervention protocols while at home. A constraint was applied to the unaffected extremity to encourage use of affected extremity and patients were given a target goal of wearing the constraint for 90% of their waking hours. Onsite treatment took place at the Research Institute Health and Wellness Center's Center for Rehabilitation Research and consisted of repetitive, task-oriented training including structured, progressive shaping and task practice activities. Off-site treatment included a behavioral contract, home skill assignment, and home diary to optimize carryover of skills from the clinic to home.

Preliminary data analysis showed improvements between pre and post test scores measuring:
- Joint specific and total limb movement
- Upper extremity coordination and dexterity
- Upper extremity function in activities of daily living
- Perception of amount and quality of upper extremity function
- Perception and satisfaction with occupational performance

A qualitative measure reported by each patient was the increased automatic use of the affected extremity signifying improvements in motor learning that enable the performance of functional activities without conscious thought of each movement. This is a necessary step to improving everyday function.

Characterizing the Experience of Black Americans Seeking Mental Health Services in Rural Oklahoma: A Three-Part Study Approach

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Background: Rural Black Americans face mental health disparities due to the intersection of race, geography, and systemic barriers. Mental health services are limited, and utilization remains low, highlighting the need for comprehensive research on barriers and facilitators impacting service use.

Objectives: This dissertation explored the mental health service landscape for rural Black communities by (1) conducting a scoping review of available literature, (2) investigating provider perspectives on service delivery challenges, and (3) examining community members' experiences with mental health service utilization.

Methods: A scoping review identified studies on rural Black Americans and mental health services. Semi-structured interviews were conducted with mental health providers and community members. Thematic analysis identified barriers, facilitators, needs, and challenges in service delivery and utilization.

Results: The review highlighted community-oriented and electronic services as key resources. Providers reported mistrust, regulatory and legislative constraints, and inadequate mental health literacy as barriers, while community engagement and diversity, equity and inclusion (DEI) initiatives in care delivery facilitated service use. Community members reported cultural skepticism, stigma, and geographic isolation as major barriers, but faith and social support systems facilitated access.

Discussion: Triangulation of the studies identified interconnected barriers to mental health access for rural Black communities including economic strain, low mental health literacy, logistical challenges, geographic isolation, and cultural mistrust. Shared facilitators included community trust, faith-based support, and culturally relevant care. This dissertation advocates for an integrated approach involving economic support, culturally relevant education, policy reform, and partnerships with community and faith-based organizations to increase mental health service utilization among rural Black communities.

Conclusion: Barriers to mental health service utilization are rooted in social and cultural contexts, but community-based and faith-driven programs offer pathways for improving access. Providers and community members emphasized the need for culturally tailored interventions, collaborative policy development, and ongoing support for providers serving rural Black communities. Future research should focus on co-developing solutions with these communities to address mental health disparities.

Pilomatricoma: A Clinical Case Report and Literature Review

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Pilomatricoma is a rare benign tumor that arises from the hair follicle matrix. It has a variety of presentations that makes it difficult to recognize, and its rarity further complicates diagnoses as medical professionals often mistake its clinical manifestation as being a lipoma or epidermal inclusion cyst. Despite an unclear etiology, early identification of these tumors is important as they carry a risk of undergoing malignant transformation to pilomatrix carcinoma. We present a report of a 52-year-old man with a case of two pilomatricomas located on the upper right and upper left arm in order to shed light on this rare disease in hopes to educate the medical community.

In this patient, the mass on the right arm had an estimated measurement of a 2.5cm diameter that grew over the past six months, and the mass on the left arm had an estimated measurement of a 1cm diameter that has not increased in size since emergence. Local anesthesia was injected to the area surrounding the masses, and a vertical incision was made to allow for removal. The excised masses were sent for pathology testing, where it was determined to be pilomatricoma.

Accounting for less than one percent of all benign skin tumors, pilomatricoma typically presents as a non-tender subcutaneous nodule found in the face, scalp and upper extremities. These benign tumors have a bimodal peak distribution seen during the first and sixth decades of life, where 90% of cases are seen in individuals twenty years of age or younger. It is also more likely to be seen in the female population with a 2:1 ratio. Not only did our case show pilomatricoma in a male patient, but it also presented in a patient whose age is inconsistent with the bimodal peak distribution previously recorded. It also manifested as a skin-colored nodule with no erosions breaking through the skin surface, which differs from the typical bluish discoloration seen in majority of cases.

Most cases of pilomatricoma have been shown to have a CTNNB1gene mutation in the hair follicle matrix. This gene normally encodes the β-catenin protein that allows for growth of the hair shaft, but if continuously active, the matrix divides uncontrollably to cause its formation. Pilomatricoma was also reported to have an association with myotonic dystrophy, familial adenomatous polyposis-related syndromes, Turner syndrome and Rubinstein-Taybi syndrome. Additionally, its formation has been linked with some external causes such as tattoos and repetitive intramuscular injections.

The clinical characteristics of pilomatricoma vary between patients, and therefore, are often misdiagnosed. Further, it is important to understand the possible etiologies of the benign tumor in order to prevent damaging treatments. Our purpose of this case study was to help educate members of the medical community regarding the diagnosis of pilomatricoma as well as bring to light unique properties in its clinical presentation not previously recorded.

Exploring the Impact of CrossFit on Physical and Psychological Outcomes in Participants with Spinal Cord Injury: A Qualitative Study

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Spinal cord injury (SCI) is a neurological disorder that occurs due to trauma, illness, or degeneration, leading to impairments in sensory, motor, and autonomic functions. The decline in physical fitness after injury leads to higher demands for healthcare services, increased dependence on caregivers for daily activities, lowered mental well-being, and a higher likelihood of developing long-term health conditions. The purpose of this study was to identify the factors, experiences, or circumstances that emphasize movement is medicine, and exercise is important for people impacted by SCI, including their care partners.

Seventeen participants (12 people with SCI; 5 care partners) were interviewed. Participants were predominantly male (n=12), with a median age of 60 years (IQR=11) and most with little exercise experience and no CrossFit experience. People with SCI were presented with injury levels ranging from C5 to L3, 4 used manual wheelchairs, 4 used power wheelchairs, and 4 were ambulatory.

A phenomenological qualitative approach with semi-structured, individual, interviews were used. Interviews were transcribed verbatim using Otter.ai and analyzed by hand using deductive reasoning. Codes were developed with consensus between two researchers and grouped into overarching themes.

Analyses revealed several key themes contributing to the participants' continuous attendance to CrossFit classes: 1) more independent and self-sustaining due to physical gains; 2) sense of community and belonging; 3) growth mindset and improved mental well-being; 4) accessibility, availability, no financial commitment, coach support, like-abled peers and interest towards exercise type since for most of the participants, this is their first experience with CrossFit; and 5) continued exercise at home.

Significant physical improvements, including enhanced cardiovascular function, strength, balance, and sleep quality, provided subjective feelings of greater independence, were noted in individuals with SCI following participation in CrossFit classes. In terms of socialization, the supportive and inclusive environment during the classes fostered a strong sense of community, helping participants build camaraderie and engage with an affinity group. The cohort members had an improved outlook on life and the establishment of a daily routine contributed to participants' sustained motivation and regular activity in the classes.

Adaptive exercise programs like CrossFit improves both physical and mental health outcomes in individuals with SCI. Clinicians should recognize the value of personalized and community-oriented fitness programs that endorse physical function, emotional well-being and social connection. Participants' improvements in cardiovascular health, strength, and mental health imply that incorporating group-based CrossFit-like classes into rehabilitation programs could lead to more holistic and unyielding recovery.

Assessing the Impact of Prenatal Care Access on Congenital Syphilis Rates: A Comparative Analysis of Texas and Oklahoma

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Syphilis is a sexually transmitted bacterial infection caused by Treponema pallidum. Syphilis can present in the adult in several different stages as well as in the newborn (congenital syphilis). Congenital syphilis can be acquired trans-placentally during pregnancy, as well as during birth, and is associated with miscarriage, stillbirth, premature birth, significant neurological complications, bone abnormalities, anemia and other disorders. Texas and Oklahoma have both seen a large increase in cases of congenital syphilis in the past decade. The key to understanding this phenomenon may lie in a comprehensive analysis of all the relevant risk factors affecting this group of individuals including, but not limited to, adequate prenatal care. Prenatal care access is critical for monitoring fetal development, screening to protect both the fetus and mother, and reducing mortality rates associated with complications. The purpose of this study was to compare rates of congenital syphilis in Texas and Oklahoma, with a focus on a single factor, rates of accessing prenatal care. We conducted a retrospective analysis of congenital syphilis rates (cases per 100,000 live births) and prenatal care rates (use the same cases per 100,000 live births). We hypothesized that lower rates of prenatal care would be associated with higher rates of congenital syphilis. In 2022, Texas reported an incidence rate of 246.8 cases of congenital Syphilis per 100,000 live births while Oklahoma reported a rate of 227.2 cases of congenital Syphilis per 100,000 live births. The percentage of live births in Texas for which pregnant mothers received adequate prenatal care in 2022 was 69.7% while the percentage of live births in Oklahoma for which pregnant mothers received adequate prenatal care was 77.5%. Thus, lower rates of prenatal care correlate to higher rates of congenital syphilis, which supports our hypothesis. Adequate prenatal care is essential for the prevention and treatment of diseases known to cause harm to a growing fetus such as syphilis. A focus on access to care and reduction of costs should be a primary goal of local health officials in the prevention of congenital syphilis.

Tirzepatide Induced Liver Injury: An Underappreciated Adverse Reaction

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Glucose-dependent insulinotropic polypeptide and glucagon-like peptide 1 (GIP/GLP-1) agonists are increasingly prescribed for type 2 diabetes mellitus (T2DM) and obesity. A 52-year-old male with a BMI of 34.3 was hospitalized for elevated liver function tests (LFTs) and underwent a laparoscopic cholecystectomy for suspected choledocholithiasis and cholecystitis. Preoperatively, he was treated with metformin and tirzepatide for T2DM, and both medications were continued postoperatively. Over the course of several hospital admissions, he continued to experience increases in his LFTs, in addition to worsening jaundice and pruritus. Several weeks prior to his initial presentation, tirzepatide had been added to metformin for further glycemic control. A Roussel Uclaf Causality Assessment Method (RUCAM) score for drug induced liver injury (DILI) was calculated four weeks following the initial presentation and yielded an R-value of 7, indicating probable causality of liver injury. After a thorough investigation, including a percutaneous liver biopsy to exclude other etiologies, it was determined that the patient had DILI secondary to tirzepatide use. To date, only four reported cases of DILI from GLP-1 agonists, one of which was due to tirzepatide, have been reported. With the increasing use of this class of medication, physicians should be aware of the potential for hepatic injury as an adverse effect.

Exploring Variations and Correlations between the Vertebral Artery and Internal Carotid Artery Systems in Relation to Skull and Endocast Size

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The progressive increase of human brain size throughout evolutionary time can be partially attributed to increases in cerebral blood flow (CBF) via the internal carotid artery (ICA) and the vertebral artery (VA). Previous research has demonstrated that CBF can serve as a reliable proxy to estimate brain tissue volume and subsequently brain size in humans. Studies have also highlighted a correlative relationship between ICA and brain size, suggesting that an increase in perfusion rates follows an increase in primate forebrain size. Thus, a detailed understanding of CBF can be achieved through accurate measurements of the ICA and its relationship to both soft and hard tissue structures. This study investigates the relationship between hard (cranial) and soft (vascular and nervous) tissue structures, specifically the ICA, VA, and brain tissue alongside the bony canals (internal carotid canal, ICC; vertebral canal, VC) or cranial vaults (endocast) they are contained within.

Using 3D Slicer, we collected endocast and brain volume (mm3), as well as the circumference (mm) and area (mm2) of the ICA, ICC, VA, and VC from 48 individuals (18 females, 30 males), representing three primate species: Cebus capucinus (n = 7), Saimiri sciureus (n = 31), and Sapajus apella (n = 10). All data was normal. To compare within and across species, we accounted for size using Mosimann variables and phylogenetic relationships. Ratios were created to examine if the ICC and VC can be used as proxies for the ICA and VA as well as if endocast volume can be used as a proxy for brain size.

Using R, paired t-tests showed there was a significant difference between the right and left sides across the sample in the ICC ($p = 0.005$), but all other variables showed no significant differences between right and left sides ($p > 0.05$) or between males and females ($p > 0.05$). Phylogenetic generalized least squares (PGLS) analyses showed no significant relationship between ICA and ICC, VA and VC, or ICC to endocast volume and VC to endocast volume. The ICA/ICC and VA/VC ratio showed (respectively) 49-77% and 62-95% for C. capucinus, 36-79% and 34-97% for S. saimiri, and 42-73% and 68-95% for S. apella. ANOVAs showed significant differences between S. sciureus and S. apella for both VA/VC circumference ($p= 0.04$) and area ($p = 0.03$), but no other significant differences were established across species. Brain/endocast volume showed a range of 27-71% across all species.

These results indicate that the bony canals associated with the CBF cannot be used as proxies for the vascular tissues they contain. Additionally, these results show that endocast size cannot be used as a proxy for brain tissue volume or mass – a mistake often made in the archaeological literature. Future research is needed to establish if humans exhibit similar trends to other primates or if there are unique features of the human brain that better relate to the CBF.

Unraveling the Plantaris Muscle: A Rare Variant Case of Double Plantaris and Its Clinical Significance

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Although often regarded as vestigial, the plantaris muscle (PM) has recently garnered interest as a tendon graft source due to its minimal functional role. Typically, the PM is a small muscle with a long, slender tendon situated between the gastrocnemius and soleus muscles, inserting into the calcaneal tuberosity. While the muscle has little functional significance, anatomical variations in the PM can carry important clinical implications, particularly in surgical and imaging contexts. PM tendons have been effectively used in reconstructive surgeries, including anterior cruciate ligament (ACL) repairs, rotator cuff repairs, and even atrioventricular valve repairs. The plantaris tendon is especially useful for graft procedures, as its removal results in minimal functional deficits.

During a routine dissection, a unique double PM was identified in the right popliteal region of a 43-year-old male donor. Two distinct PMs were observed, designated as the Superior PM (sPM) and Inferior PM (iPM) following previous study nomenclature. Both muscles originated from the lateral supracondylar line; however, the sPM exhibited a bifid muscle belly and tendon integrating with the gastrocnemius muscle, whereas the iPM followed the typical origin and insertion.

To assess the prevalence and anatomical variability of the plantaris muscle (PM), measurements were taken from a sample of 20 male and female cadaveric donors. Data collected included the origin, insertion, and tendon length, as well as muscle belly width and length. Descriptive statistics were used to analyze the data collected. Preliminary results indicate considerable variability in PM measurements, highlighting the natural anatomical diversity in plantaris muscle presentation among donors.

Anatomical variations in the PM, while often considered functionally minimal, can have important clinical implications. This case of a double PM enhances the understanding of anatomical variations in the plantaris muscle and underscores the importance of recognizing such variants in clinical and surgical settings, where they may impact procedural outcomes and interpretations.

Management of Severe Pneumocystis Pneumonia in a Non-HIV Patient: A Case Study

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Pneumocystis pneumonia (PCP), caused by *Pneumocystis jirovecii*, poses a significant risk to immunocompromised individuals, including those on prolonged glucocorticoids. The study highlights a case of PCP in a non-HIV patient, exploring challenges in diagnosis, treatment alternatives, and outcomes to inform clinical management.

We present an 82-year-old male with a history of bullous pemphigoid treated with prednisone, coronary artery disease, and other comorbidities. The patient presented with worsening hypoxemia, fever, and cough. Diagnostic evaluations included chest imaging, beta-glucan testing, and bronchoalveolar lavage. Treatment was initiated with vancomycin, cefepime, azithromycin, and supplemental oxygen. Upon confirmed PCP diagnosis, the first-line treatment was adjusted due to a sulfonamide allergy, utilizing a combination of primaquine, clindamycin, and adjunctive prednisone. Beta-glucan levels (>500 pg/mL) and PCR confirmed *Pneumocystis jirovecii*. Initial oxygen support was escalated from a nasal cannula to a venturi mask. Due to drug unavailability, atovaquone temporarily replaced primaquine. Over eight days, oxygen requirements decreased, physical therapy resumed, and the patient transitioned to oral atovaquone, clindamycin, and a prednisone taper. Discharge occurred with a planned 12-day continuation of therapy and pulmonology follow-up. This case underscores the importance of early recognition and tailored treatment strategies for PCP in non-HIV patients, especially those with contraindications to standard therapies. The successful outcome demonstrates the efficacy of alternative regimens and highlights the necessity of multidisciplinary collaboration in managing complex cases.

Uncommon presentation of patent foramen ovale with acute limb ischemia and pulmonary embolism

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Introduction:
Patent foramen ovale (PFO) is a common congenital cardiac anomaly present in about 25% of adults. While often asymptomatic, PFO can facilitate paradoxical embolism by allowing venous thromboemboli to enter arterial circulation. Cryptogenic stroke is the most frequent manifestation. This case report presents a rare occurrence of acute limb ischemia (ALI) and pulmonary embolism (PE) without neurological symptoms, highlighting the importance of considering PFO in patients with simultaneous arterial and venous thromboembolic events.

Case Presentation:
A 70-year-old male with a history of ulcerative colitis post-colectomy presented with sudden right arm pain, numbness, and chest tightness. Vital signs showed hypertension at 165/95 mmHg. Initial evaluations for acute coronary syndrome and stroke—including EKG, troponin levels, head CT, and brain MRI—were unremarkable. Sublingual nitroglycerin alleviated chest discomfort but was followed by ischemic changes in the right hand, including cyanosis and absence of radial and ulnar pulses. CT angiography revealed occlusion of the right brachial, radial, and ulnar arteries, as well as a PE in the right pulmonary artery without right heart strain. An emergent open thrombectomy restored arterial flow in the affected limb. Further investigations with transthoracic and transesophageal echocardiograms confirmed a large PFO with bidirectional shunting, establishing the diagnosis of paradoxical embolism.

Discussion:
This case illustrates a rare presentation of PFO manifesting as ALI and PE without preceding stroke. The concurrent occurrence of arterial and venous emboli underscores the necessity of evaluating for intracardiac shunts like PFO in similar scenarios. Early detection and management—including surgical thrombectomy and percutaneous PFO closure—are critical in preventing recurrent embolic events. Recent studies support the efficacy of PFO closure in reducing the risk of paradoxical embolism beyond stroke prevention.

Conclusion:
PFO should be considered in patients presenting with simultaneous arterial and venous thromboembolic events, even without neurological symptoms. This case emphasizes the importance of comprehensive evaluation for paradoxical embolism and supports the role of PFO closure in preventing further complications.

Addition of an Immunomodulator to Infliximab Monotherapy Restores Response in IBD: A Case Series, Systematic Review, and Meta-Analysis

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Introduction:
Infliximab (IFX) is a common treatment for inflammatory bowel disease (IBD), but its efficacy can diminish over time due to the development of anti-drug antibodies (ADAs), which reduce IFX levels in the body. To prevent this, immunomodulators (IMMs) such as methotrexate or thiopurine are sometimes added to IFX therapy. However, there is limited research on the effectiveness of adding an IMM to IFX in patients who have already developed ADAs and are losing response to treatment. This study evaluates the impact of reactive combination therapy (rCT), i.e., the addition of an IMM to IFX after ADA development, on clinical response, IFX levels, and ADA titers.

Methods:
We conducted a retrospective analysis of IBD patients who began IFX therapy alone between January 2000 and June 2023 and later added an IMM (azathioprine, 6-mercaptopurine, or methotrexate) to restore response to IFX. Additionally, we performed a systematic review and meta-analysis of studies examining rCT to assess its impact on ADA titers, IFX trough levels, and clinical outcomes. Pooled data was analyzed using a random-effects model to estimate the effect size.

Results:
In our cohort, six IBD patients who received rCT showed significant improvements. The median ADA titer decreased by 85% (from 506 ng/mL to 76.5 ng/mL, p=0.031), and the median IFX trough level increased by 20.6 times (from 0.4 µg/mL to 8.25 µg/mL, p=0.038). A systematic review identified seven studies with 89 patients treated with rCT after loss of response to IFX. Meta-analysis showed that rCT reduced ADA titers by 87% (95% CI: 72-94%), increased IFX trough levels by 6.7-fold (95% CI: 2.4-18.7), and achieved clinical remission in 76% of patients (95% CI: 59-93%). The average time to immunologic response was 10.8 weeks (95% CI: 8.43-15.93).

Discussion:
Our findings suggest that the addition of an IMM to IFX therapy in patients with elevated ADAs and reduced IFX levels is effective to restore both IFX therapeutic levels and clinical remission. This method significantly reduces ADA levels and improves clinical outcomes. Further studies are needed to compare the efficacy of different immunomodulators in this setting to optimize treatment strategies for IBD patients.

Improving tobacco use screening and cessation counseling in a primary

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Tobacco use is the leading preventable cause of death; responsible for an estimated 7 million deaths globally, and more than 450,000 deaths in the U.S. annually. Healthcare costs from tobacco-related illness in the U.S. equals to approximately $300 billion each year. Smoking leads to many health conditions such as cardiovascular disease, pulmonary disease, and cancer.

By using a standardized form of documentation to screen patients for tobacco use at Conway Medical Group, we will see an increase in patients who get screened and therefore a greater number of patients who receive cessation counseling or pharmacotherapy.

The goal of this QI project was to increase screening of tobacco use at CMG; a primary care clinic led by family medicine residents. To do this, we developed a standardized “intake form” that included questions related to tobacco use and was used by nurses when rooming patients. Also, we created a template in our EMR to document the answers. Based on that, residents would be able to provide cessation counseling or treatment. The EMR was used for data collection by dropping a CPT code based on patient answers if they smoke or want counseling. Clinic staff were educated on how to use these new forms of documentation. The study was conducted over a 7-month period from October 2023 to April 2024. The percentage of patients screened and who received cessation counseling or therapy were analyzed pre and post intervention.

From January 2023 to September 2023 approximately 84.64% of patients were screened for tobacco use at CMG and 22.56% received smoking cessation counseling. After implementing the study, 90.52% of patients were screened for tobacco use and 41.36% received smoking cessation counseling.

Having the right tools and education to deliver a smoking cessation intervention improves the health and wellness of patients. With this study we found that utilizing a standard way to screen patients on tobacco use ultimately increases the number of patients who get screened and who also receive counseling or therapy when compared to a clinic not having those resources. We found the percentage of patients screened for tobacco use increased by 5% after using the intake form and EMR template. In addition, we saw an even greater number of patients who received cessation counseling or therapy, by 45%. Some limitations of this study were the time frame of 7 months, looking at the percentage of patients rather than the exact number, and confounding factors like patient dishonesty, staff compliance, or improper documentation.

Uncontrolled Diabetes and Severe Hyperglycemia: The Importance of Considering Occult Cushing's Syndrome

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Case Report: Cortisol plays a critical role in glucose metabolism regulation. It stimulates glucose synthesis in the liver and kidney, promotes glycogen breakdown in both skeletal muscle and liver, and elevates blood sugar levels by reducing glucose uptake in muscle and adipose tissues. Currently, between 38.9% and 76.9% of patients with type 2 diabetes experience uncontrolled diabetes, with approximately 25% of these individuals exhibiting hypercortisolism. Preliminary findings, including reports from the CATALYST trial, indicate that cortisol blockade leads to rapid glucose reduction and improved diabetes control. This report details a case of difficult-to-control diabetes, ultimately revealing occult Cushing's disease.

A 73-year-old male with a history of chronic myeloid leukemia (CML) in remission and right renal carcinoma was referred to endocrinology for management of uncontrolled type 2 diabetes, diagnosed four years earlier. During his initial visit, he was alert and oriented, weighing 75.4 kg with a BMI of 23.8, and his blood pressure was 110/84 mmHg. The physical examination was unremarkable, with no apparent stigmata of Cushing's syndrome.
Despite high doses of insulin and SGLT2 inhibitors, his HbA1c remained above 11-15%. After referral, his insulin dosage was increased to 200 units daily, and Tirzepatide was added, later switched to Semaglutide 2 mg weekly due to availability. His Dexcom CGM showed persistent uncontrolled glucose, with an average around 375 mg/dL, 3% time-in-range, 96% time-in-very-high-range, 0% time-below-range, and a GMI of 14.5. He adhered to diet and exercise and medical regimens.
Laboratory evaluations, including complete blood counts and metabolic panels, were unremarkable. C-peptide levels were 2.7 ng/mL (normal range: 1.1-4.4 ng/mL), and diabetes autoimmune antibodies were negative. Hormonal assessment of the hypothalamus-pituitary-adrenal axis revealed elevated 24-hour urine cortisol (60.6 mcg/24h; normal: 4-50 mcg/24h), elevated midnight salivary cortisol (0.373 ug/dL; normal: 0.010-0.090 ug/dL), and a 1 mg overnight dexamethasone suppression test (DST) showing cortisol at 6.2 ug/dL (normal: <1.8 ug/dL) with dexamethasone at 413 ug/dL. Morning cortisol was 20.5 ug/dL, DHEA was 152 ng/dL (normal: 21-402 ng/dL), and ACTH was 19.9 pg/mL (normal: 3.3-63.3 ng/mL). An MRI of the pituitary revealed a 3 mm tumor. The patient is being referred for bilateral petrosal vein ACTH sampling to determine tumor laterality and potential surgical intervention. Due to poor glycemic control, mifepristone (Korlym) initiation is planned before the procedure.

This case of uncontrolled type 2 diabetes with occult Cushing's syndrome highlights the need for cortisol evaluation and the necessity and possible protocol development using mifepristone treatment prior to surgery.

Sudden vision loss in a 37-year-old female: a case study of ocular syphilis

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Syphilis is a sexually transmitted infection that can be asymptomatic or cause widespread symptoms in various organ systems, often leading to delayed or missed diagnoses. Syphilis infection begins with a painless ulceration known as a chancre which can occur in or on the mouth, genitals, anus, and the rectum. The rate of syphilis infection in the United States has increased dramatically, with a 2,140% increase in primary and secondary syphilis in 2020 compared to 2000.

This is a case of a 37-year-old female who presented with burning and pruritus of her eyes and was unsuccessfully treated for conjunctivitis twice, first with erythromycin ointment and then with a combination of polymyxin B and ketorolac eye drops. One month afterwards, she woke up with painless vision loss she described as “whited out.” Her ophthalmologist prescribed steroid eye drops and eventually systemic steroids which resolved her symptoms. She also had bloodwork performed which showed high RPR titer and positive syphilis IgG/IgM treponemal testing.

She presented to the ED at her physician’s request and lumbar puncture was performed which was negative. She reportedly had had one monogamous sexual partner for the last 5 years. Infectious disease was consulted, and the patient was started on a continuous penicillin G infusion, 24 million units/day for 10 days. The day after initiating treatment, the patient developed severe myalgias which was determined to be a Jarisch-Herxheimer reaction and was successfully managed with NSAIDs.

Both ocular syphilis and otosyphilis should be treated as neurosyphilis, even if CSF testing is negative. Neurosyphilis can occur at any stage of syphilis and requires more aggressive treatment and follow-up. All patients with syphilis should have repeat titers drawn 6 and 12 months after treatment to ensure adequate response and for future comparison. If the patient’s titer is substantially higher in the future, this is indicative of reinfection. More repeat titers or even a repeat lumbar puncture may be required, depending on the type and stage of syphilis. Treponemal testing such as IgG and IgM will likely be positive for life, although some patients with primary syphilis will become seronegative 2-3 years after treatment.

Syphilis is becoming increasingly more common and has a variety of presentations; it may mimic many other diseases or be asymptomatic. It is vital that healthcare providers have a high index of suspicion so patients can receive diagnosis and treatment as early as possible, minimizing or eliminating long-term complications.

Missed Opportunities: Addressing Gaps in Behavioral Health Care for Pregnant and Postpartum Women in Arkansas

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Behavioral health events, including mental health and substance abuse diagnoses, in the prenatal and postpartum periods impact mothers and their families during a critical time in their lives. Utilizing data from the Arkansas Healthcare Transparency Initiative's All-Payer Claims Database, the Arkansas Center for Health Improvement (ACHI) examined behavioral health events in the prenatal and postpartum periods among 80,704 Arkansas mothers who gave birth between Jan. 1, 2019, and June 30, 2022.

The objectives of this study were to quantify the frequency of behavioral health events during the prenatal and postpartum periods and to determine the extent to which follow-up care was occurring after these events. A follow-up behavioral health visit was defined as an outpatient visit occurring within 120 days after an emergency room visit or inpatient stay with a primary behavioral health diagnosis. Secondary diagnoses were not considered. ACHI also compared the timing of postpartum mothers' outpatient follow-up visits within 120 days after behavioral health events to the timing of follow-up visits among all women ages 18-44 in Arkansas.

Our study found that behavioral health events were more likely to occur in the postpartum period compared to the prenatal period. This was true for outpatient visits (12.4% prenatal vs. 23.1% postpartum), emergency room visits (1.3% prenatal vs. 2.4% postpartum), and inpatient stays (0.7% prenatal vs. 2.6% postpartum). Compared to all Arkansas women ages 18-44, postpartum mothers consistently had lower follow-up visit rates after an emergency room visit or an inpatient stay. Our study also found that 59% of postpartum mothers had no follow-up behavioral health visit within 120 days of an emergency room visit and that 56% of postpartum mothers had no follow-up behavioral health visit within 120 days of an inpatient stay.

Findings from this study highlight the critical need to improve behavioral health outcomes for postpartum mothers in Arkansas. The low rates of follow-up care after emergency room visits and inpatient stays suggest that despite the availability of behavioral health services, significant barriers prevent postpartum mothers from accessing timely follow-up care. Efforts to address these barriers — such as enhancing care coordination, increasing awareness of available resources, and reducing stigma — could improve outcomes among this vulnerable population.

A Modified Protocol for Purifying Peroxisomes from Melanoma Cell Lines

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Peroxisomes have crucial functions in cellular health including beta-oxidation of VLCFAs, reduction of ROS, and synthesis of plasmalogens. Dysregulation of peroxisomal metabolism has also recently been implicated in the development of certain types of cancer. Current methods of isolating peroxisomes can take more than 1 hour to purify after homogenization. This can lead to structural distortion and misleading experimental results. Sabatini et al. published a protocol for peroxisome purification that was quicker, but difficult to reproduce. Here, we present a modified protocol for purifying peroxisomes using nitrogen cavitation that is easily reproducible, and takes less than 30 minutes from the time of cellular lysis.

Materials needed include HA/MYC peroxisome tagged Melanoma cell lines, anti-HA monoclonal ab, Magnetic Dynabeads, KPBS Buffer, protease inhibitor tablets, monoclonal mouse-anti human Ab's for targeting cell compartments (PMP70, Catalase, LMNA, GAPDH, Calreticulin), Cavitation Bombs and N2 gas, and centrifuge.

- Step 1: Begin with 12 million cells seeded in 15 cm plates (HA/MYC) and rinse each plate with 10 mL cold KPBS buffer three times then rinse again three times with KPBS + Protease Inhibitor (1 tablet/10 mL of KPBS)
- Step 2: Collect cells in 500 uL of KPBS + protease inhibitor
- Step 3: Add the collected cells into chilled N2 bombs. Pressurize bombs to 500 psi with N2 and let sit on ice w/ mag spin for 20 minutes.
- During this time, wash dyna-beads (50uL beads per sample) 3 times with KPBS. Incubate dyna-beads in 1 mL KPBS + 10 uL anti-HA to bind antibody and rotate tubes in cold room for 1 hour. Wash 3x with KPBS + protease inhibitor using magnet after incubation.
- Step 4: After 20 min collect 100 uL TCH for each sample in a tube with 8% EDTA. Release pressure slowly to lyse cells but maintain organelle integrity. Centrifuge TCH tubes @1000g for 2 mins at 4C.
- Step 5 (IP Bind & Wash): Incubate 80% of PNS with HA/MYC tagged dyna-beads for 1 hour or overnight. Wash samples three times as before and rotate at 25C for 10 mins. It is crucial to change tubes after the second wash to minimize contamination.
- Step 6: (Western Blot): Incubate samples with antibodies listed in materials section to target various cell compartments and peroxisomes to confirm purification success.

This protocol was verified by western blot and reliably demonstrates success in isolating peroxisomes with no contamination. Verification was done using multiple monoclonal anti-peroxisome antibodies which only showed bands in experimental lanes. The antibodies were determined to be specific to peroxisomes by analyzing peroxisomes in antibody-incubated cells under confocal microscopy. To determine whether contamination was present, antibodies against nuclear, Golgi, ER, and cytoplasm proteins were also used, and bands appeared only in the control lanes. Overall, the protocol was demonstrated to be effective, reliable, reproducible, quick, and easy to implement.

LKB1 Localizes to Peroxisomes in Melanoma and Protects against Ferroptosis.

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Ferroptosis is a modality of cell-death that involves iron-dependent lipid peroxidation. Fenton reactions forming free radicals lead to the generation of phospholipid hydroperoxides (PLOOHs) that disrupt membrane integrity leading to cell death. It has been demonstrated that certain types of apoptosis-resistant cancers are particularly susceptible to death by ferroptosis. Many metabolic and cellular processes regulating cancer development and progression have inputs to ferroptosis including the LKB1-AMPK (liver kinase b1- amp kinase) pathway and very-long chain fatty acid (VLCFA) oxidation by peroxisomes.

LKB1-AMPK activation in melanoma has been shown to negatively regulate ferroptosis, and in response to energetic stress, melanoma has been shown to shift from glycolysis to fatty acid oxidation. Using a peroxisome purification process we demonstrated that LKB1 localizes to peroxisomes in human melanoma cells. We also compared the efficacy of ferroptosis inducers in WT and LKB1-knockdown cells and showed that loss of LKB1 sensitizes melanoma to known ferroptosis inducers.

Two cell lines were generated using a retrovirus: one contained an HA tag on peroxisomes (experimental), and another contained a MYC tag on peroxisomes (control). Using anti-HA magnetic Dynabeads, we isolated peroxisomes from HA-cells. The lack of peroxisomes using MYC-cells served as a control. Total cell homogenate and post-nuclear supernatant was obtained for both cell lines. Immunoprecipitation for TCH and PNS samples was done using an anti-LKB1 antibody. LKB1 was detected from HA-cells peroxisomes only. Catalase and green-fluorescent protein (GFP) were detected in HA-TCH and PNS, but not in controls.
We generated LKB1 knockdown cells by designing sgRNA against LKB1 in px458/px459 CRISPR vectors which were transfected into the cells. Knockdown was confirmed by incubation with ampicillin and fluorescence monitoring. We then compared susceptibility to cell death in wild-type melanoma and LKB1-knockdown melanoma cells by increasing levels of Erastin/RSL3. Dilutions of Erastin/RSL3 were added to wells and cells were. LKB1 knockdown increased cell death compared to control, indicating LKB1 confers a protective role to melanoma.

There is much work yet to be done to untangle the inputs and outputs of ferroptosis to cancer. The drug dilution experiment must be repeated to demonstrate reproducibility and the HA/MYC experiment should also be reproduced both in the same cell line and in other melanoma cell lines to further validate our initial results. Why LKB1 localizes to peroxisomes and whether it complexes with other proteins is still unknown and serves as another avenue of future inquiry. The study of ferroptosis is still in its infancy, but we believe these experiments demonstrate that the intersection of ferroptosis to energy-regulatory pathways in melanoma cells remains a promising target for future cancer therapeutics.

The Growing Crisis: Rising Rates of Congenital Syphilis in Arkansas and Across the Nation

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Congenital syphilis (CS) is a consequence of vertically transmitted maternal syphilis and poses a significant threat to infants with a wide range of clinical manifestations and severity. The United States has witnessed an alarming rise in CS with Arkansas ranking among the top 10 states with the highest incidence rates. This retrospective epidemiologic study aims to analyze trends and contributing factors to the climbing rates of CS nationally and in Arkansas utilizing annual reports from 2018 to 2022. Through analysis of publicly available data from the Centers for Disease Control and Prevention (CDC) and the Arkansas Department of Health (ADH), this research examines specific trends involving race, CS outcomes in patients, and changes in incidence rates by year. Mandated reporting of Syphilis and CS to the CDC's National Notifiable Diseases Surveillance System (NNDSS) allows for accurate data acquisition and overall disease monitoring. Our analysis reveals significant upward trends in the cases and rates of CS. In 2022, there were 3,769 cases of CS nationally, representing an 184.5% increase from the 1,325 reported cases in 2018. Arkansas specifically saw 69 cases in 2022 increased from 25 in 2018 revealing a 176% increase in cases. The incidence rate per 100,000 people in 2022 was 102.5 nationally and 191.9 in Arkansas alone marking a considerable escalation of rates from previous years. While the growth of cases remains evident, pronounced inflation of incidence rates signifies increasing cases are not directly due to population growth alone. Nationally, CS incidence rates have also increased across all racial groups with American Indians and Alaskan Natives exhibiting the highest 2022 rate at 644.7. This represents a 533.3% increase in the rate from just 4 years prior. This information is especially paramount because the number of stillbirths, infant deaths, and symptomatic children has increased each year depicting the serious consequences of CS. Data analysis also reveals a greater upsurge of rates from 2020-2021 than 2019-2020 highlighting the impact of the COVID-19 pandemic. The pandemic has profoundly impacted the healthcare system with multiple factors allowing widespread untreated Syphilis propagation. Most states require serology testing for Syphilis at initial prenatal visits while Arkansas also requires testing in the third trimester. Despite having these screening protocols in place, elevation in CS associated morbidity and mortality prompts further investigation into additional risk factors such as socioeconomic status, sexual behavior, and ability to obtain necessary health care services. We seek to inform public health policy to reduce CS cases in Arkansas. Identifying and understanding CS statistical trends is essential for developing and implementing effective prevention strategies that ensure the health and safety of both mothers and their newborns.

The Effect of Altered Gravitational Forces on the Human Body: Literature Review

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Advancements in aviation and space travel continue to be made. It is important that we discuss and understand the effects of altered gravity on the human body as this field continues to grow. Many of the systems in the body are affected by significant gravitational changes. The vestibular system can be altered with microgravity which can cause motion sickness, dizziness, and impaired balance. Arterial baroreceptors can be reset during long-term increased gravity. Many pilots experience microgravity and hypergravity throughout their careers. However, military pilots experience repeated high gravitational forces daily. This is important because one of the most common complaints from military pilots is neck and lower back pain. This literature review focuses on the musculoskeletal system and part of the cardiovascular system and proposes future research in this field. Fighter pilots tend to become more dehydrated during their flight. There is a correlation between high G forces and higher rates of neck pain which was typically seen at 4-5 G forces. After 8 months of high gravitational force training, there was a significant increase in total bone mineral content and cervical bone density compared to other spine regions. Additionally, the study showed that most of the strain on the spine in flight is on the neck. The prolonged constrained sitting and the helmet's weight in addition to the gravitational forces contribute to the frequent complaint of neck pain. Studies recommend redesign of the cockpit to improve the musculoskeletal complaints. If this is not possible another recommendation would be personal lumbar support. There are current gaps in the research when comparing the effects of gravity on male and female pilots and when looking at the impact of high gravitational forces on biomechanics—our future research plans to address this.

Bleeding Clues: A Rare Dengue Fever Case in a Returning Traveler

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Introduction

Dengue fever is a mosquito-borne viral illness endemic to tropical and subtropical regions. In non-endemic areas, including the United States, it is typically seen in travelers returning from endemic regions. We present the case of a 32-year-old male who developed dengue fever following a recent trip to Mexico. This report emphasizes the challenges of diagnosing and managing dengue in non-endemic settings, particularly when patients present with atypical symptoms such as gum bleeding and thrombocytopenia.

Case Presentation

A 32-year-old male with no significant medical history presented with a 6-day history of fatigue, feverish sensation, abdominal pain, and distention. Symptoms began 3 weeks after returning from Mexico, initially with chills, myalgia, progressive fatigue, loss of appetite, and one episode of non-bloody emesis. He also reported a nagging cough with a single episode of blood-tinged sputum and gum bleeding. On examination, the patient had slight abdominal distention, minimal tenderness, and hepatomegaly; other findings were unremarkable. The patient, a Spanish speaker requiring an interpreter, reported that several family members in Mexico had similar symptoms, with two requiring hospitalization. He mentioned having had similar symptoms before, but without gum bleeding. Laboratory investigations revealed severe thrombocytopenia (9 K/uL), leukopenia, transaminitis, proteinuria, and hematuria. Imaging showed peri-cholecystic fluid, hepatic steatosis, and free fluid in the right upper quadrant. A dengue panel confirmed the diagnosis with positive IgG antibodies. The patient was treated with IV fluids and acetaminophen. Due to severe thrombocytopenia, he received platelet transfusions, with counts monitored every 8 hours. Infectious disease and gastroenterology consultations recommended continued supportive care. The patient showed gradual clinical and laboratory improvement and was discharged after ensuring stability, with no ongoing bleeding and a rising platelet count.

Discussion

This case highlights the diagnostic challenge of dengue fever in non-endemic areas like the United States, where it is rare and typically seen in returning travelers. The patient's presentation, including severe thrombocytopenia and gum bleeding, could be mistaken for other hematological or infectious conditions. The positive dengue IgG and the patient’s family history of illness in Mexico helped confirm the diagnosis. Early recognition and supportive care are essential to prevent severe complications. This case underscores the need for heightened awareness among clinicians in non-endemic areas, especially as global mobility increases the risk of undiagnosed dengue cases and delayed management.

Unmasking HIV: CMV colitis as the first clinical manifestation

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Introduction

Cytomegalovirus (CMV) is a double stranded DNA (deoxyribonucleic acid) virus that can cause AIDS (acquired immunodeficiency syndrome) defining illness. Most cases of CMV colitis occur in a state of advanced immunosuppression with CD4+ counts < 50. AIDS related CMV disease is usually the result of reactivation of latent infection. The clinical manifestations of CMV infection are diverse and influenced by the host's immune status. Gastrointestinal involvement with CMV is uncommon in immunocompetent hosts but can cause significant morbidity and mortality. CMV colitis is usually secondary to the reactivation of latent infection in immunosuppressed. The appearance of CMV colitis on colonoscopy can vary from superficial erosions to deep ulcerations and necrotizing colitis with biopsy usually being confirmatory. We present a case of a patient who initially presented with signs of colitis, diagnosed with CMV colitis, which led to the identification of underlying HIV infection.

Description

A 62-year-old male with past medical history significant for aortic valve replacement and atrial fibrillation presented with abdominal pain and hematochezia for 5 days. He had been experiencing chronic diarrhea for over 2 months with 35-40 pounds weight loss in the past year. The patient had no prior history of colonoscopy.

On arrival at the ED, he was hypotensive and anemic with hemoglobin of 8.9. Computerized tomography of abdomen was suggestive of colitis. He was started on empirical antibacterials for possible bacterial intrabdominal infection. He underwent colonoscopy that revealed multiple large ulcerations scattered throughout the colon which were biopsied. Pathology demonstrated intracellular viral inclusions consistent with CMV colitis. Initial serum CMV qPCR was > 1.2 million IU/mL. Subsequently HIV screen was positive with CD4 count of less than 20. The patient was started on ganciclovir with clinical improvement in symptoms. He was discharged on valganciclovir and bictegravir/tenofovir alafenamide/emtricitabine. The patient markedly improved after initiation of ganciclovir and anti-retroviral therapy.

Discussion

AIDS is defined as a CD4 cell count of less than 200 cells/microL or the presence of any AIDS-defining condition regardless of the CD4 cell count. AIDS defining illnesses include cytomegalovirus (CMV) disease, candidiasis, pneumocystis jirovecii, mycobacterium avium complex infection, toxoplasmosis, etc. CMV disease is one of the most common AIDS defining illnesses. This case provides an opportunity to reinforce the importance of considering HIV in patients presenting with opportunistic infections like CMV colitis for early diagnosis and institution of treatment for better outcomes.

Successful Endoscopic Management of Gastric Volvulus in a Young Adult

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Introduction

Gastric volvulus is defined as rotation of the stomach beyond 180 degrees. It typically occurs in children under one year of age and adults over 50. Approximately 30% of cases are classified as primary, while the remaining 70% are attributed to underlying anatomical abnormalities involving the stomach, spleen or diaphragm, including paraesophageal hernias. We describe a case of successful derotation of gastric volvulus with mild obstructive symptoms that developed as a complication of paraesophageal hernia in a young adult.

Description

A 24 year old with no significant medical history presented to the emergency room (ER) with a 3 day history of intractable vomiting. He had been experiencing nausea and dysphagia for 3 months which contributed to his 20 lbs weight loss over this period. The patient had tried tums with no relief. In the ER, vital signs were stable except tachycardia. Labs included a white blood count of 22.9/microL. Computerized tomography of abdomen pelvis was suggestive of acute appendicitis, pending clinical correlation. General surgery had minimal suspicion for acute appendicitis as the patient had no abdominal pain or tenderness. GI was then consulted, and he underwent EGD that revealed paraesophageal hernia with gastric volvulus that was endoscopically derotated with restoration of normal anatomy. He was also noted to have erosive esophagitis. Symptoms markedly improved following the reduction of gastric volvulus. He tolerated diet without nausea or vomiting. He was discharged home on pantoprazole 40 mg twice daily for 8 weeks.

Conclusion

Gastric volvulus is a rare complication of paraesophageal hernia. The presentation can range from mild obstructive symptoms such as nausea and vomiting to gastric ischemia or perforation. Primarily, it can be a challenging diagnosis because it is rarely suspected. In addition, imaging findings are often subtle, leading to many cases being identified only during surgery. Careful history taking and prompt diagnosis can lead to timely management with good outcomes. Our case highlights that patients that present with acute gastric volvulus who show no signs of critical illness can often be effectively managed with initial endoscopic intervention.

Cannabis Consumption In Correlation to Brain Alterations: Causative Implications for Susceptibility to Schizophrenia

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Schizophrenia is a multifactorial psychiatric disorder defined by frequent hallucinations, clinical cognitive deficits, delusions, and impaired executive function. Research demonstrates correlations between cannabis use and schizophrenia development, specifically in young adults. Cannabis consumption alters both the endocannabinoid system and neurochemical pathways, subsequently leading to changes in brain morphology. The mechanism of pathophysiology is not fully understood, emphasizing the need to further investigate cannabis use pertaining to schizophrenia susceptibility. This literature review highlights the current knowledge on the correlative effects of cannabis use on brain morphology and its structural implications related to schizophrenia development.

A comprehensive review of peer-reviewed literature on PubMed was conducted, focusing on studies published between 2000 and 2023. These studies explore the impact of cannabis use on brain structure, function, and association with the development of schizophrenia. Keywords used in the search include “schizophrenia”, “cannabis”, “psychosis”, “brain”, “comorbidity”, and “adolescent”. Other criteria for inclusion are peer-reviewed journals as well as English-language publications, collectively ceding 12 articles for analysis.

There is accumulating evidence that the consumption of cannabis alters the endocannabinoid system, which is a similar implication of schizophrenic patients. The cannabinergic system caters to developing the dopamine systems, regulating synaptogenesis, and brain plasticity. Exogenous cannabinoids alter the natural development of the endocannabinoid system during adolescence, leading to increased susceptibility to schizophrenia. Additional studies suggest a significant reduction in total cerebellar volume and gray matter in adolescents using cannabis. Similarly, both cannabis users with and without schizophrenia showed reduced cerebellar white-matter volume compared to healthy non-users, with the most significant reduction observed in cannabis users with schizophrenia (29.7% decrease). In addition, research that utilizes mouse models clinically imply that adolescent cannabinoid exposure can cause changes in behavior and molecular pathways – pathways that could in the future be used as potential targets for therapy. These findings magnify the vulnerability of adolescent brains to the effects of cannabis, and its impact on schizophrenia-related symptoms.

In all, this review emphasizes the link between the use of cannabis and the development of schizophrenia. It is of importance to further research and understand the mechanistic pathology of cannabis use and its direct relationship with the development of schizophrenia. Effective prevention strategies and targeted treatment towards those at high risk of developing schizophrenia can then be clinical explorative options.

Functional Outcomes from Treating Prostate Cancer with HIFU

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Background
High-intensity focused ultrasound (HIFU) is an innovative, minimally invasive method for treating localized prostate cancer. The HIFU procedure involves inserting a rectal probe to target the tumor with concentrated ultrasound waves. Imaging techniques, such as MRI or ultrasound, are utilized throughout the procedure to ensure precision in targeting the cancerous tissue. Performed as an outpatient treatment, HIFU typically requires only one session. Patients generally resume normal activities within a few days due to the minimally invasive nature of the procedure. By offering alternatives to radical interventions (chemotherapy, radiation, and surgery), HIFU aims to maintain a balance between effective cancer control and preserving functional outcomes, such as urinary continence and sexual function. Both whole-gland and focal ablation approaches have been studied, with attention to their safety, efficacy, and patient-reported outcomes in both initial and repeat treatment settings.

Methods and Procedures
This analysis incorporates findings from systematic reviews, registries, and clinical trials involving over 8,000 participants. Standardized tools, including PSA nadir, biopsy outcomes, IPSS, EPIC, and IIEF scores, were used to evaluate treatment efficacy and complications. Follow-ups ranged from 1 to over 10 years. Data analysis involved meta-analyses, regression models, and comparisons between whole-gland and focal HIFU, as well as primary versus repeat treatments.

Key Findings
Efficacy: Whole-gland HIFU resulted in PSA nadir levels of 0.4–1.95 ng/mL and biopsy negativity rates of 63–81%. Focal HIFU showed similar cancer control with PSA nadirs of 1.9–2.7 ng/mL but fewer complications.
Safety: Adverse events included urinary incontinence (2–10%), impotence (21–44%), and urinary obstruction (2–15%). Focal HIFU showed reduced complications compared to whole-gland approaches, while repeat HIFU had higher urinary leakage rates without increasing sexual dysfunction.
Functional Outcomes: Focal therapy demonstrated superior recovery in sexual potency (IIEF: 13 vs. 9; $p = 0.04$) and urinary continence.
Patient-reported Outcomes: Most focal HIFU patients regained baseline erectile function within 6–12 months, with peak phosphodiesterase-5 inhibitor use at 6–9 months.

Conclusion
HIFU, particularly focal therapy, offers effective and safe treatment for localized prostate cancer while preserving functional outcomes. Repeat HIFU remains a viable option with manageable side effects. Further prospective studies are needed to confirm these findings and establish long-term outcomes for HIFU modalities.

AI Meets Oncology: Speeding Up Cancer Drug Development and Precision Medicine

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Introduction
Cancer's intricacy and resistance to treatment make it a leading cause of death worldwide. Conventional approaches to discovering new drugs can be expensive, slow, and costly, and do not necessarily lead to successful treatments. However, artificial intelligence (AI) has become a compelling tool in cancer research for discovering novel drugs. Leveraging machine learning (ML), AI can assist in drug development and identifying specific targets for therapy while increasing efficiency. Here we explore AI's contribution to drug discovery, key findings, and discuss its potential to change cancer therapies.

Mechanism
AI uses advanced computer methods like ML and network-based algorithms to improve the drug discovery process. These methods can predict drug interactions with specific biomarkers (drug-target interactions) and analyze large biological data sets (multi-omics data). This process addresses problems like drug resistance and tumor complexity. Several techniques such as graph neural networks and Bayesian models show high accuracy in predicting DTIs, outperforming traditional methods. Furthermore, AI uses information from genes, proteins, and metabolites to identify biomarkers most sensitive to therapeutic drugs.

Methods & Results
Past Research has demonstrated AI's capability to improve cancer therapies. Topics include analyzing multi-omics data, researchers have found biomarkers GATA2 and miR-124-3p, which help guide personalized treatments. A 90% accuracy is achieved in predicting DTIs with the use of AI tools. accelerating the refinement and testing of these drugs, decreasing costs and saving time especially when it comes to the preclinical phase. These advancements make it possible to create treatments tailored to the specific molecular features of a patient's cancer.

Discussion
AI is renovating the way cancer is discovered and treatment. It can handle large amounts of data and find new treatment targets, which may be especially useful for rare or hard-to-treat cancers. Through further research, incorporating AI-identified biomarkers into clinical trials and using real-world patient data will assist in refining personalized cancer treatment. These advances could lead to innovative treatment that will improve survival rates and quality of life for patients, marking a major step forward in precision oncology.

Natural Marine-Derived Fucosylated and Sulfated Glycans Inhibit Notch Activation in Ovarian Cancer Cells

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Ovarian cancer continues to have unacceptably high mortality rates. The identification of methods to intercept disease progression and recurrence are needed. Glycosylated compounds are very safe and stable as drugs, and their medical applications in blocking clotting as well as viral and bacterial pathogenesis have been successful. Prior research indicates that glycan changes, bisecting N-linked and O-fucose, that occur on glycoproteins in ovarian cancer play roles in promoting the expansion of the cancer stem cells or tumor initiating cells. The Notch signaling pathway plays a prominent role in tumorigenesis and is a high priority target for the development of new therapeutics that can block cancer stem cells. In this pilot study we show that the fucosylation and the sulfation groups on certain natural marine-derived glycans are key structural requirements for the inhibition of Notch activation. We measure the binding affinities of these natural glycans with key glycosaminoglycan-binding proteins of ovarian cancer cells such as Wnt using surface plasmon resonance. Using reporter assays for Notch, Wnt, and Hh we determine the efficacy of these natural glycans for single and multiple pathway inhibition. Finally, we demonstrate that the Notch inhibition mediated by natural marine-derived glycans works in synergy with suppression of Notch glycosylation in Radical Fringe knockout cells.

Examining Cardioembolic Stroke Risk in a Cadaveric Donor with Severe Cardiomegaly and Atrial Fibrillation

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The rising life expectancy in the United States is accompanied by a growing prevalence and diagnosis of atrial fibrillation, which has led to an increased incidence of cardioembolic stroke. Atrial fibrillation shares a bidirectional causative relationship with cardiomegaly, driven by structural remodeling as part of cardiac adaptation. Cardiomegaly arises from various processes that induce a chronic abnormal workload on the heart, leading to progressive sarcomeric additions to cardiomyocytes. Clinically, it is diagnosed when a cardiothoracic (CT) ratio exceeds 50%, determined by comparing the transverse cardiac silhouette to chest diameter ratio on a plain radiograph or computed tomography scan. This research examines the correlation between atrial fibrillation and severe cardiomegaly and how early identification and management contribute to a reduction in cardioembolic stroke risk.

An 81-year-old cadaveric donor with congestive heart failure as the known cause of death and a longstanding history of persistent atrial fibrillation was dissected under standard procedure in a graduate healthcare profession course. This case report utilizes a descriptive research design to explore the findings of the unique donor. Visual examination of the dissected thoracic cavity revealed severe cardiac enlargement, reduced left lung size, abnormal heart and lung vasculature, and a cardiac resynchronization therapy device. Further dissection revealed abnormal renal vasculature, global enlargement of the abdominal aorta, and an abdominal aortic aneurysm 10mm from the common iliac junction. The anatomic donor's cardiac mass (810g) was significantly larger than the dissection cohort average of 348g (n = 5 male donors), with a modified CT ratio (cardiac width/thoracic cavity width) of 58.4%. To our knowledge, this is the largest recorded case of cardiomegaly ever reported in a cadaveric donor and demonstrates an individual at a heightened stroke risk.

Due to the advanced age of the donor (above the national mortality age), this case study highlights that early recognition and management of persistent atrial fibrillation and cardiomegaly are vital in reducing the risk of cardioembolic stroke in at-risk populations, even in severe cases. The anatomic donor exemplifies the disruption of a delicate balance related to hypercoagulability and blood stasis, emphasizing the need for prompt treatment to reduce stroke risk, especially as the incidence of atrial fibrillation increases.

Trends in Appendicitis Incidence and Appendectomy in the United States: A 2016–2021 Retrospective Analysis

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Appendicitis is a leading cause of acute abdominal pain that can be managed surgically with appendectomy or conservatively with intravenous antibiotics. When left untreated, the risk of perforation increases which can lead to sepsis and death. Appendectomy is typically a well-tolerated procedure when diagnosed promptly. The incidence and management of appendicitis in the United States over time is not well described in the literature. Here we report a database study evaluating the trends in appendicitis incidence and management to inform healthcare policy and federal funding allocation. This cross-sectional, retrospective study evaluated inpatient discharges with a diagnosis of appendicitis following appendectomy in the United States from 2016 to 2021. Data was extracted from the Healthcare Cost and Utilization Project (HCUP) and analyzed using chi-square and z-tests. Of the more than 200 million discharges during the study period, there were 928,840 patients diagnosed with appendicitis (0.45%) and 883,145 patients who underwent appendectomy (0.42%). The majority of patients with appendicitis were male (54.22%) and the most common age bracket was those 18-44 years (35.8%). The vast majority of patients with appendicitis underwent appendectomy (95.1%). The rate of appendicitis per 100,000 population decreased significantly from 54.0 in 2016 to 41.2 in 2021 ($P<0.001$). Similarly, the rate of appendectomy per 100,000 population also dropped significantly from 51.4 in 2016 to 39.0 in 2021 ($P<0.001$). Patients diagnosed with appendicitis in 2016 were more likely to undergo appendectomy compared to patients diagnosed in 2021 (95.3% vs. 94.7%, $P<0.00001$). Appendicitis is a common cause of abdominal pain primarily affecting male patients 18-44 years of age. The incidence of appendicitis and appendectomy in the United States are decreasing, and more patients are increasingly being treated nonsurgically with antibiotics. Despite the decreasing incidence of appendicitis, it remains a prevalent condition with significant health risks if managed inappropriately. Early identification with modern imaging technology is critical in minimizing complications. Further research into the efficacy of conservative management is warranted to guide practice guidelines and minimize the morbidity and health expenditure associated with disease recurrence.

Treatment of Coronary Lesions With ELCA

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Background
PCI is a routine procedure in the treatment of CAD. The goal of PCI is to restore vital blood flow to the heart. PCI is commonly achieved using a catheter deployed with a balloon and or stent to relieve a narrow segment of a coronary artery. Some coronary lesions, however, are not amenable to traditional PCI due to excessive narrowing within the artery. Excimer Laser Coronary Angioplasty or ELCA is an adjunct to PCI treatment that may provide a solution to certain complicated PCI procedures. This article provides a brief review of the use of ELCA in treating coronary artery lesions.

Description
ELCA involves the use of a 308-nm ultraviolet laser energy to ablate plaque tissue. A catheter equipped with excimer laser technology is advanced to the site of the lesion. The breakdown products of the lesion are small enough to not cause distal embolization. After ablation of the plaque tissue, a catheter can be passed through the stenosed segment to deploy a stent. The FDA currently has 12 approved indications for the use of ELCA, including balloon uncrossable and un-dilatable lesions, chronic total occlusions (CTOs), saphenous vein graft lesions (SVGs), and in-stent restenosis (ISR).

Methods and Key Findings
Safety data is largely from the National Cardiovascular Data Registry/CATH PCI Registry from 2009-2018, which allows for a large-scale retrospective review on overall ELCA use. Types of lesions evaluated in this registry include, in-stent restenosis (ISR), saphenous vein grafts (SVG), thrombotic, and chronic total occlusions (CTOs).
Safety: Although more recent data points towards fewer complications, ELCA is associated with a higher risk of complications than traditional PCI. Overall, the complication rate for death, cardiac tamponade, dissection, or perforation was 4.2%, while non-ELCA interventions had a complication rate of 3.0% ($p<0.001$). The rate of the combination of death, cardiac tamponade, dissection, or perforation associated with ELCA use was lowest in the patients with ISR (2.5% vs 5.3% in all other lesions, $P<0.001$) and patients with SVG lesion (3.3% vs 4.3% in all other lesions; $P=0.04$). Other studies outside of the registry also point towards lower complication rates for ELCA use in ISR.
Limitations: Study data is limited to evaluating procedural success, longitudinal studies are not readily available to access long-term post-ELCA complications. There is also a lack of randomized trials to directly compare ELCA and non-ELCA interventions. The data from the registry is broad and does not specify exact ELCA procedures used. Studies on ELCA use often do not clarify the feasibility of other treatment modality or if ELCA is the only option due to inability to do a traditional PCI.

Conclusion
Complication rates with ELCA use are higher than in traditional PCI. However, ELCA is mostly used to treat already complex lesions. While further studies are needed, ELCA seems to provide a solution to complex coronary lesions.

Management of Acute on Chronic Hypercarbic Respiratory Failure in a Patient with Forequarter Amputation for Desmoid Tumor

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Desmoid tumors are rare, slow-growing, fibroblastic tumors. They are locally invasive and sometimes present management challenges due to their growth patterns and high recurrence rates. Surgical resection is utilized when conservative measures fail, which may lead to significant long-term complications. This case report discusses the presentation, management, and recovery of a 69-year-old woman with a history of radical surgery for a desmoid tumor and subsequent development of acute on chronic hypercarbic respiratory failure.

This is the case of a 69-year-old woman with a prior history of desmoid tumor, refractory to chemotherapy and radiation. Due to tumor progression and extensive involvement, she underwent a radical forequarter resection, which included amputation of two and a half ribs, the left clavicle, half of the sternum, and the left arm. She also required a left lung lobectomy due to a subsequent lung collapse. Post-operatively, the patient developed restrictive lung disease which was managed by her pulmonologist by nocturnal oxygen therapy. Eight years after surgery, in 2024, the patient returned to her primary care physician with multiple complaints over the course of two months. She initially presented with a mid-thoracic spine compression fracture, upper back pain, and increased oxygen use. A CT scan ruled out pulmonary embolism but revealed newly developed cardiomegaly. Her symptoms progressed to severe shortness of breath, worsening hypoxia, and tachycardia. The patient called emergency medical services and received an EKG in her home, but was not transported to the hospital. The following day she revisited her PCP % additional symptoms like confusion, vivid dreams, dizziness, and nausea. Concerned by the escalation of symptoms, the patient was asked to go to the Emergency Department (ED), where she was diagnosed with acute on chronic hypercarbic respiratory failure.

In the ED, the patient was treated with non-invasive ventilation (NIV), specifically BiPAP with magnetic straps for improved comfort and ease of use for her. She showed significant improvement and was eventually transferred to a rehabilitation facility, where she continued to show gradual recovery and improvement in her respiratory status.

This case highlights the need for a multidisciplinary approach in managing desmoid tumor patients, particularly those who require extensive surgical interventions. Long-term follow-up is essential for finding and managing complications such as restrictive lung disease and chronic respiratory failure. NIV can be an effective therapeutic modality in managing respiratory distress in such patients, offering symptomatic relief and improving overall outcomes. Further research into the long-term effects of desmoid tumor resection and strategies to manage related respiratory complications is warranted to enhance care management for these complex cases.

Pancreatitis Secondary to Cryptosporidium-Associated Cholangiopathy in an Immunocompetent Adult

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Cryptosporidium parvum is a protozoan transmitted via the fecal-oral route, causing significant morbidity and mortality worldwide. In the U.S., it causes about 823,000 cases annually. It is known for affecting immunocompromised patients, causing AIDS cholangiopathy. In immunocompetent hosts, it typically causes self-limiting diarrhea. This report describes a rare case of acute pancreatitis due to cryptosporidium-associated cholangiopathy in an immunocompetent adult.

A 64-year-old female presented with abdominal pain and watery diarrhea after working with sick goats. She developed a fever, nausea, vomiting, and persistent diarrhea. She had no chronic medical conditions and took black cohosh for menopausal symptoms. Her past surgical history included a cholecystectomy. Examination revealed dry mucous membranes and epigastric tenderness. A CT scan showed dilated bile ducts and mild enteritis. Elevated lipase and liver function tests were noted. Stool PCR was positive for Clostridium difficile and cryptosporidium. An MRCP showed biliary dilatation and a distal stricture. An ERCP confirmed these findings, and a biliary stent was placed. The patient was diagnosed with acute pancreatitis secondary to cryptosporidium cholangiopathy and treated with nitazoxanide, oral vancomycin, intravenous fluids, antiemetics, and pain control, leading to significant improvement.

Acute pancreatitis (AP) is an inflammatory process with an incidence of 110 to 140 per 100,000 population and a mortality rate of about 20%. It is commonly caused by ethanol ingestion, gallstones, or hyperlipidemia. About 10% of cases are due to infectious agents, including Cryptosporidium, which typically causes self-limited enteritis in immunocompetent hosts but can cause severe disease in immunocompromised patients. Extraintestinal manifestations like cholecystitis, cholangitis, hepatitis, and pancreatitis have been described in patients with low CD4 counts. AIDS cholangiopathy is characterized by multifocal strictures and segmental dilations in the bile duct, diagnosed through imaging and histopathological evaluation. In this case, malignancy was ruled out, confirming cryptosporidium-induced cholangiopathy.

Recognizing the diverse etiologies of acute pancreatitis, including rare associations like Cryptosporidium cholangiopathy, underscores the importance of thorough diagnostic evaluations.

Dapsone induced Methemoglobinemia and Hemolytic anemia treated with Vitamin C

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Introduction
Methemoglobinemia, a potentially life-threatening condition, is caused by the formation of Methemoglobin(MetHb), an oxidized form of hemoglobin(Hb) in which the oxygen-carrying capacity of blood in body tissues is reduced.

Case report
We present a case of 56-year-old female with a history of mucous membrane pemphigoid (MMP) and depression, presented to ED from outpatient oncology for elevated creatinine and shortness of breath over a month, associated with fatigue. Initial evaluation in ED showed correction of AKI but patient was requiring 2 l/min oxygen to maintain oxygen saturation at 90%. Hemoglobin was 9.8g/dl with MCV 104.3fl but BNP, troponin, EKG, Chest x-ray, COVID-19, CT angiogram chest were negative. Overnight patient continued to worsen with oxygen saturation 85%, which did not improve even with high flow oxygen. ABG showed PaO2 of 154mmHg indicating discordance between PaO2 and SpO2. Patient reported ongoing dapsone therapy of 100mg daily over a year for MMP, thus methemoglobinemia was suspected. Additional lab work showed LDH 351U/L, haptoglobin <20mg/dl, reticulocyte count of 5.8%, suggesting hemolysis. Peripheral blood smear revealed bite cells and Heinz bodies confirming hemolytic anemia. G6PD levels and direct antiglobulin tests were normal. Methemoglobin level was 18.1% confirming methemoglobinemia. She was managed with IV ascorbic acid 1500mg and folic acid to counter oxidative stress. Patient's home medications also included amitriptyline and escitalopram. Due to reports of serotonin syndrome following methylene blue administration in patients concurrently taking serotonergic agents and our patient's clinical improvement with vitamin C, methylene blue was not administered. Patient was eventually weaned off oxygen with reduction in methemoglobin level to 3.9%.

Discussion
Dapsone is a major cause of drug-induced acquired methemoglobinemia, attributed to hydroxylated amine metabolites, which are potent antioxidants hypothesized to hematologic adverse effects like hemolytic anemia and methemoglobinemia. Diagnosis is based on clinical symptoms and laboratory tests, particularly ABG analysis. While methylene blue is the standard antidote, vitamin C offers a potential alternative for mild symptomatic cases due to its antioxidant properties, ability to scavenge free radicals, and its role in recycling alpha-tocopherol in cell membrane for NADP reductase in glutathione metabolism and can directly reduce methemoglobin showing effectiveness in treatment.

Conclusion
Physicians should remain vigilant for the association between dapsone use and methemoglobinemia or hemolytic anemia. Comprehensive ABG analysis including methemoglobin levels is essential for unexplained hypoxia in a patient on dapsone therapy. Methylene blue should be used cautiously due to the risk of serotonin syndrome when combined with serotonergic agent. High-dose vitamin C is a safe and promising alternative for treating methemoglobinemia.

Not All Wheezing Is Caused by Asthma: A Rare Case of Severe Bronchial Stenosis

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Bronchial stenosis is the narrowing of the bronchus at any location within the bronchial tree. It may arise from congenital or acquired causes. Acquired bronchial stenosis can develop following trauma, surgical interventions, retained foreign bodies, chronic inflammation linked to rheumatic diseases, or infections.

Case Presentation: A 77-year-old Caucasian female with a history of DM, hypertension, and asthma presented to the ER with a complaint of progressive shortness of breath, cough, nasal congestion and increased sputum production. She reported feeling weak and having trouble ambulating over the past few days. Upon examination in the ER, patient was tachypneic, tachycardic, with significant wheezing. She had temperature of 102.1°F and maintain oxygen saturation on 3l nasal oxygen. The patient tested positive for COVID-19 and was initiated on treatment with ceftriaxone, doxycycline, and remdesivir for acute respiratory failure and sepsis secondary to COVID-19 pneumonia. CT demonstrates atelectasis and/or consolidation in the right lower and middle lobes, with reduced aeration in their respective airways. Bronchoscopy performed shows right middle lobe bronchus, which is patent and exhibits scant thick purulent secretions. The right lower lobe bronchus reveals significant narrowing, preventing cannulation, with thick purulent secretions. Following bronchoscopy and ballon dilation, patient showed marked improvement in the respiratory symptoms. Wheezing improved and showed marked improvement in Chest Xray.

Discussion: Patient presented to ER with worsening shortness of breath despite home treatment for long-standing asthma. In Hospital, bronchoscopy was performed due to a lack of improvement despite receiving guideline-directed therapy for asthma. Common causes of worsening respiratory symptoms, such as infections, were ruled out. Bronchoscopy revealed severe bronchial stenosis. This finding may be related to chronic airway inflammation associated with long-standing asthma; however, the exact mechanism of stenosis progression remains unclear. It is important to recognize that while bronchial stenosis is a rare complication in asthma, it can occur in cases of prolonged inflammation and airway remodeling. This condition should be considered in patients with unexplained airway obstruction, particularly after ruling out more common causes of acquired bronchial stenosis, such as infections, prior trauma, or foreign body retention.

Pembrolizumab associated Pulmonary and Cutaneous Sarcoidosis in a patient with Malignant Melanoma

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Introduction

Pembrolizumab is anti PD-1 humanized monoclonal antibody which prevents T cell suppression and helps generate antitumor responses. It acts by binding to PD1 receptor on T cells and blocks binding of PD1 ligands and inhibit negative immune response. It is commonly used for the treatment of resected or advanced malignant melanoma.

Case Presentation

59-year-old female nonsmoker recently diagnosed with melanoma s/p pembrolizumab came to the pulmonology clinic for evaluation of extensive mediastinal and retroperitoneal adenopathy. She complained of progressive shortness of breath with intermitted low-grade fever, fatigue, and night sweats. She was diagnosed with malignant melanoma following tissue biopsy for lesion in the left calf in January 2023. She underwent wide excision with sentinel lymph node biopsy and started on pembrolizumab in January 2023 to Dec 2023.

PET-CT scan in December 2023 was negative for any signs of metastasis or adenopathy. Repeat PET scan in May 2024 shows extensive mediastinal and hilar adenopathy. Patient underwent EBUS with biopsy of the lymph node 7 and 4R which shows non caseating granulomas. Biopsy is negative for any underlying metastasis or melanoma. Serology negative for acid fast bacilli, fungal antigen and ANCA. Repeat CT on 10/17 shows Interval improvement/resolution of the mediastinal adenopathy.

Discussion

Immune checkpoint inhibitors can cause benign granulomatous lesions affecting less than 1% of patients. It can cause early to late presentation of mediastinal adenopathy. We rule out other causes of granulomatous disease including endemic fungal, bacterial, and autoimmune causes. History rules out any environmental exposure. These are crucial steps for recognizing side effects of immunotherapies. Sarcoidosis and SLRs are recognized to highly imitate the oncologic progression of primary disease, therefore posing diagnostic difficulties. Starting on steroid therapy remains controversial as this may jeopardize the therapeutic efficacy of immunotherapy. Sarcoidosis and SLRs, though rare, can present in oncologic patients treated with ICIs. Physicians should be aware of this possibility and the related diagnostic and therapeutic challenges.

Chronic abdominal pain in median arcuate ligament syndrome (MALS)

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Median arcuate ligament syndrome (MALS), also called celiac artery compression syndrome, celiac stenosis, or Dunbar syndrome, is a condition in which the median arcuate ligament (MAL) compresses the celiac artery and causes recurrent, chronic abdominal pain. MALS is a relatively rare condition, affecting 2 per 100,000 people, typically women 40-60 years of age. The etiology remains unknown, with small evidence suggesting hereditary linkage. It can also be caused by abdominal trauma or surgery. Patients typically experience abdominal pain postprandially and during exercise. The pathophysiology is due to the partial mesenteric ischemia created when bowel activity or physical activity constricts blood flow through the celiac artery at the site of the median arcuate ligament (MAL), inducing symptoms such as pain, unintentional weight loss, and nausea. MALS is typically suspected with a clinical triad of weight loss greater than 20 pounds, an abdominal bruit, and postprandial pain. Diagnosis is confirmed through inspiratory and expiratory duplex ultrasound, as well as contrast-enhanced computed tomography (CT) of the abdomen and pelvis. Additional findings such as poststenotic dilation or flow velocities greater than 200 cm/second in the celiac artery, further support the diagnosis.3 Management typically involves surgical decompression of the celiac artery, performed through minimally invasive techniques or, in some cases, interventional stenting. This report outlines the difficulties of evaluating chronic abdominal pain and diagnosing MALS.

Fever and sepsis in an AIDS patient secondary to PCP PNA

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Introduction:
Pneumocystis jirovecii, a yeast-like fungus, is found in immunocompromised patients such as those with HIV/AIDS. It is transmitted airborne from person to person. This opportunistic pathogen leads to Pneumocystis pneumonia (PCP), a rare and fatal lung infection. Pneumocystis organisms attach to type I alveolar epithelium allowing an invasive and inflammatory host response. This causes significant lung injury and impaired gas exchange leading to hypoxia and respiratory failure. Patient presentation includes inspiratory crackles and bilateral symmetrical reticular opacities on imaging. In this report, we present PCP in an AIDS patient with an extensive disease history.

Case presentation:
The patient is a 49-year-old male with a history of HIV (last CD4 count of 137 two years ago), syphilis, and recent nonadherence to antiretroviral therapy (Biktarvy). He presents with fever, cough, acute mental status changes, and hypoxic respiratory failure following a recent hospital admission elsewhere for altered mental status. Upon admission, vital signs show tachycardia, tachypnea, an oxygen saturation of 94%, and he is afebrile. Labs reveal leukopenia with WBC 3.7, hemoglobin 10.8, hematocrit 33.4, and platelets 141. Imaging demonstrates bilateral ground-glass opacities, indicating atypical pneumonia.

Extensive testing revealed a CD4 count of 15 and an HIV RNA level of 433,000 IU/mL. A Hepatitis panel indicates past infection with hepatitis A and B, and a respiratory panel shows enterovirus/rhinovirus. His elevated beta-1,3-D-glucan level raises suspicion for Pneumocystis jirovecii pneumonia (PCP). Lumbar puncture showed 0 WBCs, 3 RBCs, and elevated protein at 272 mg/dL. The patient initially received vancomycin, cefepime, Bactrim, doxycycline, and amphotericin B. Following a bronchoscopy, which confirmed PCP, he remained intubated due to respiratory deterioration. CMV PCR showed a viral load of 11,000 IU/mL, prompting a regimen change to Bactrim and ganciclovir as per infectious disease recommendations. He remains intubated with stable but unimproved symptoms; monitoring will continue.

Discussion:
One of the most challenging aspects in treating PCP is the presence of cholesterol in the cell membrane, which cannot be targeted by common antifungals such as amphotericin B and azoles. Hence why TMP-SMX is considered the first line treatment for mild, moderate, and severe PCP for 21 days and treatment was altered accordingly for this patient (PMID: 33669726). Although rates have declined with antiretroviral therapy and PCP prophylaxis, it is still a common and serious infection with high mortality rates. Case reports have shown the relationship between AIDS and PCP. However, with this patient's complicated prognosis and extensive history, we are still monitoring for recovery and remission of symptoms.

The Spectrum of Guillain-Barré Syndrome: Miller Fisher Overlap in a Complex Case of Acute Neurological Decline

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Introduction:
Miller Fisher overlap syndrome (MFOS) is a rare, complex variant of Guillain-Barré syndrome (GBS) that combines features of Miller Fisher syndrome (MFS) and acute inflammatory demyelinating polyneuropathy (AIDP). MFS presents with ophthalmoplegia, ataxia, and areflexia, while AIDP involves ascending paralysis and demyelinating neuropathy. MFOS blends these presentations, posing diagnostic and management challenges. Early treatment with IVIG or plasmapheresis can improve outcomes and minimize complications.

Case Presentation:
A 67-year-old woman with type 2 diabetes and hypothyroidism presented with two days of nausea, vomiting, and bilateral lower extremity pain, initially described as proximal tingling. She was admitted for euvolemic hypo-osmolar hyponatremia due to SIADH, likely triggered by the pain. Despite improvement with fluid restriction and salt tablets, her paresthesia worsened.

On day 6 of hospitalization, she developed bilateral facial weakness, lateral rectus palsy, and lower extremity paraparesis with worsening paresthesia, triggering a code stroke. Brain CT and MRI showed no acute infarction. A lumbar puncture on day 7 revealed albumino-cytologic dissociation, confirming GBS. IVIG therapy was initiated, and respiratory function monitored due to declining negative inspiratory force (NIF).

On day 10, symptom progression and respiratory failure necessitated ICU transfer, intubation, and plasmapheresis after five days of minimal IVIG response. Following seven sessions, her condition improved slightly, and she was discharged to long-term care with a tracheostomy and PEG tube.

Two months later, she was re-hospitalized for UTI and pneumonia, experiencing a pseudo-flare of GBS with MFOS. Electromyography and nerve conduction studies indicated subacute motor and sensory polyneuropathy with axonal injury, consistent with motor axonopathy. Currently, she is recovering in inpatient rehabilitation, ambulating with a cane and wearing an AFO brace. Gabapentin and pregabalin manage her persistent paresthesia. Neurology follow-up and physical therapy support her gradual recovery.

Discussion:
This case highlights the diagnostic and clinical complexity of MFOS. The patient's presentation of bilateral paresthesia, followed by facial palsy and ophthalmoplegia, prompted suspicion for GBS. The diagnosis was confirmed by albumino-cytologic dissociation on lumbar puncture.

This case underscores the importance of recognizing MFOS in atypical GBS presentations, particularly with overlapping ophthalmoplegia and sensory-motor deficits. Despite IVIG and plasmapheresis, extensive rehabilitation was needed. Gradual recovery demonstrates the potential for improvement with multidisciplinary care, though long-term neurological sequelae persist. Early diagnosis, ongoing monitoring, and comprehensive rehabilitation are essential to optimizing outcomes in MFOS.

Navigating the Triad of Pain, Jaundice, and Bleeding: A rare case of Hemobilia

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Introduction:
Hemobilia, or bleeding into the biliary tract, is a rare but serious complication following liver biopsy. It often presents with a classic triad of gastrointestinal bleeding, jaundice, and abdominal pain, though all three are not always present simultaneously. Prompt recognition and intervention are critical to managing this life-threatening condition. This case highlights hemobilia in a patient with metastatic colonic adenocarcinoma post liver biopsy, emphasizing the diagnostic and therapeutic challenges in managing such a rare complication.

Case Presentation:
A 75-year-old female with a history of hypertension, tobacco abuse, and recently diagnosed colonic adenocarcinoma presented with acute epigastric pain and hematemesis. Six months prior, she was evaluated for iron deficiency anemia, and imaging revealed a cecal mass, intraductal papillary mucinous neoplasm of the pancreas, and multiple metastatic liver lesions. Biopsy of the cecal mass confirmed adenocarcinoma, and she underwent right hemicolectomy. Subsequent imaging showed progression of liver metastases, prompting an ultrasound-guided liver biopsy. Six days post-procedure, she developed acute epigastric pain, hematemesis, jaundice, and transaminitis with hyperbilirubinemia. A CT scan revealed a lateral right hepatic lobe hemorrhage and acute cholecystitis due to blood products obstructing the cystic duct. A HIDA scan confirmed cystic and common bile duct obstruction.

Urgent ERCP was performed, with removal of blood clots from the biliary system and placement of a biliary stent. Due to her poor surgical candidacy, a cholecystostomy drain was placed, and right hepatic artery branch embolization was performed. Despite initial interventions, the patient experienced ongoing bleeding requiring definitive embolization. Following this procedure, her abdominal pain resolved, hemoglobin stabilized, and transaminitis and hyperbilirubinemia improved.

She was discharged with a cholecystostomy drain in place. At six-week follow-up, her biliary stent and drain were removed, and she began palliative chemotherapy.

Discussion:
This case underscores the need to recognize haemobilia as a rare yet serious complication of liver biopsy. Although ultrasound-guided biopsies are considered relatively safe, they carry risks of vascular injury, particularly in patients with liver metastases or coagulopathies. In this patient, the classic presentation of epigastric pain, jaundice, and hematemesis facilitated timely diagnosis and intervention. Management requires a multidisciplinary approach involving gastroenterology, interventional radiology, and general surgery.

This case highlights the importance of early recognition of hemobilia to prevent life-threatening complications. For patients with advanced malignancy undergoing liver biopsy, careful monitoring and awareness of potential complications are crucial.

Treatment of Opioid Use Disorder with a History of Atrial Fibrillation

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Buprenorphine, a partial mu agonist and naloxone an antagonist at mu, kappa, and sigma opioid receptors, is a treatment option for substance use disorder. Buprenorphine/naloxone does carry a risk for cardiovascular adverse effects.

This case study is about a 66 year old male with a recent medical history of atrial fibrillation and atrial flutter who presents opioid use disorder treatment. The goal of this case study is to educate about the risk benefit analysis of buprenorphine/naloxone treatment in the setting of cardiovascular disease along with alternate treatment options.

On admission, the patient had a blood alcohol level of 0.146 and was placed on a lorazepam taper for alcohol withdrawal and started on duloxetine for his worsening depression. His admission electrocardiogram revealed atrial fibrillation. He was hypertensive but otherwise hemodynamically stable. The patient endorsed a history of chronic pain, which resulted in opioid use disorder. He was placed on buprenorphine 8 mg-naloxone 2 mg sublingual 1.5 tabs daily a few months ago. However, the patient developed atrial fibrillation and with his uncontrolled hypertension, buprenorphine/naloxone was discontinued. The patient began drinking alcohol to help with his opioid cravings and endorsed worsening depression due to past providers being unwilling to treat him for opioid use disorder due to his new diagnosis of atrial fibrillation.

This case highlights the difficulty of opioid use disorder treatment options in a patient with new onset arrhythmia. Atrial fibrillation is the most commonly treated tachyarrhythmia with a lifetime risk of 23-26% for men and women over the age of 40 years old.1 The incidences of arrhythmia in regards to management options for opioid antagonists were 9.57% in naltrexone, 5.71% in methadone, and 3.81% in buprenorphine.2 There were concerns that the patient's opioid antagonist treatment would pose an additional risk to his atrial fibrillation, but currently there is no such evidence. However, discontinuation of buprenorphine/naloxone poses a larger risk of relapse and overdose. There is evidence of a significant reduction in all-cause mortality of opioid agonist treatment compared to patients off opioid agonist treatment, a mortality ratio of 4.6 compared to 9.7.3 Overall, the decision was made to start and continue buprenorphine/naloxone treatment and refer any patients with unmanaged atrial fibrillation for further evaluation and management.

Rapid Interventions for Complex Delirium: Bridging Chaos to Clarity

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Delirium, or encephalopathy, is a syndrome caused by underlying medical conditions and medications. It is characterized by a sudden disturbance in mental status, increasing confusion and decreasing awareness. We present the case of a 59-year-old woman with a known history of bipolar 1 disorder, Graves' disease, and multiple sclerosis (MS) who presented to the emergency department with suicidal ideation and confusion, which rapidly progressed to severe delirium.

This patient was admitted to the inpatient medical service for stabilization. Considering she had recently completed a steroid taper for an MS flare-up per her chart, she was initially treated for suspected steroid-induced psychosis with propranolol and methimazole. Persistent hallucinations and mood instability raised concerns for bipolar I exacerbation, leading to her transfer to the psychiatric unit. Her confusion acutely worsened, with significant disorientation and waxing/waning response to internal stimuli. Suspecting an underlying medical cause, the psychiatric team transferred her to the ICU.

Steroid-induced psychosis was deemed unlikely, as she had been off steroids for 25 days. Her TSH was significantly decreased (<0.008 mU/L), but thyrotoxicosis was ruled out due to her normal T3 and T4 levels. On the second day, she developed worsening tachycardia, hypotension, and decreased oxygen saturation. A lumbar puncture and an EEG were performed. The EEG revealed moderate generalized background slowing and triphasic waves, suggesting encephalopathy. A comprehensive workup, including ammonia levels, urinalysis, CT scans, and thyroid studies revealed no new findings. While the etiology of the patient's delirium remained unclear, her MS likely increased her risk due to demyelinating brain changes.

During days 5-7, her mental status fluctuated with episodes of fever and supraventricular tachycardia. Despite empirical treatment with vancomycin and piperacillin/tazobactam, no infection was identified. Delirium precautions were used to minimize agitation and confusion, and antipsychotic use was limited to avoid prolonging the delirium. Management included creating a supportive, reorienting environment and avoiding physical restraints.

By day 11, the patient was afebrile and showed gradual improvement. On hospital day 16, she returned to baseline mentation and was discharged. Her case required a multidisciplinary approach involving neurology, cardiology, infectious disease, internal medicine, and psychiatry teams.

In patients with multiple comorbidities, delirium management involves addressing the underlying cause, supportive care, non-pharmacological interventions, and minimizing medications like anticholinergics and benzodiazepines. This case illustrates the diagnostic challenges when delirium's etiology remains uncertain and the effectiveness of a collaborative care approach.

Unmasking Sinus Node Dysfunction: A Case of Recurrent Syncope and Pacemaker Syndrome

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Sinus node dysfunction (SND) encompasses a range of abnormalities in the heart's natural pacemaker, often leading to bradycardia, sinus pauses, or atrial arrhythmias. SND is an important yet underdiagnosed condition, primarily affecting elderly patients or those with underlying cardiac conditions. Early recognition and management are crucial to prevent complications such as syncope, heart failure, or sudden cardiac death.

A 67-year-old male with a history of hypertension, hyperlipidemia, and type 2 diabetes mellitus who presented to the ED with recurrent episodes of dizziness, fatigue, and near-syncope over several months. An initial electrocardiogram (ECG) showed sinus rhythm with right bundle branch block. Holter monitoring revealed multiple sinus pauses lasting 4-5 seconds. Laboratory tests, including thyroid function and electrolytes, were normal. Echocardiography showed no significant structural heart abnormalities.

The patient was diagnosed with sinus node dysfunction. Given the severity of symptoms and worsening hemodynamic status, a permanent pacemaker was implanted. After pacemaker implantation, the patient continued to experience syncopal episodes, which resolved after increasing the pacing rate. Despite this, he had ongoing lightheadedness and hypotension, prompting initiation of Florinef. Arterial line monitoring showed a 10 mmHg drop in blood pressure with pacing, consistent with pacemaker syndrome. The pacing rate was then adjusted, leading to symptom resolution and patient was stable for discharge.

This case highlights the importance of recognizing SND, particularly in patients presenting with nonspecific symptoms such as dizziness or fatigue. Timely diagnosis and intervention, such as pacemaker implantation, can significantly improve patient outcomes. This case underscores the need for heightened clinical awareness and prompt evaluation of patients with bradycardic symptoms, especially in the elderly population.

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