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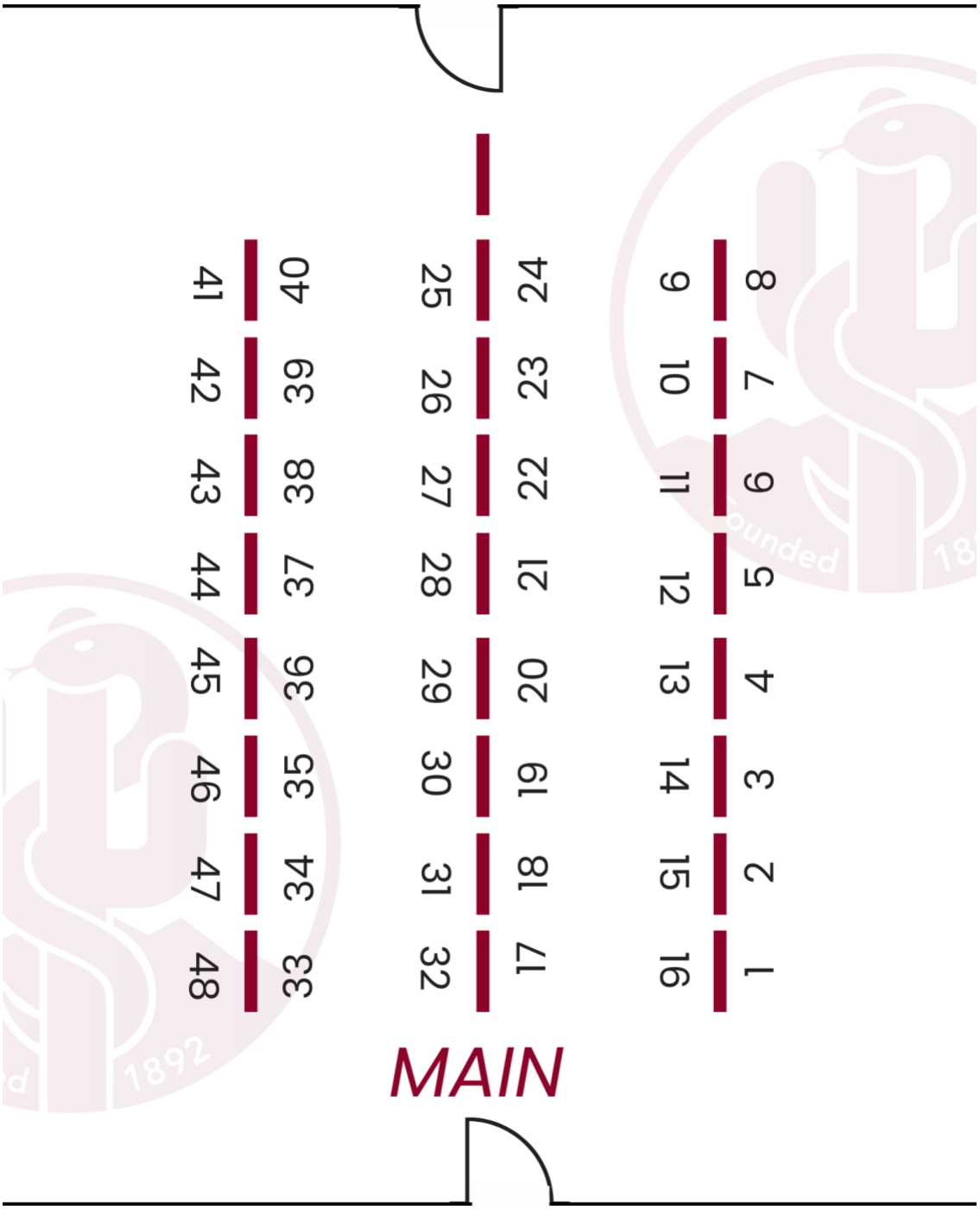

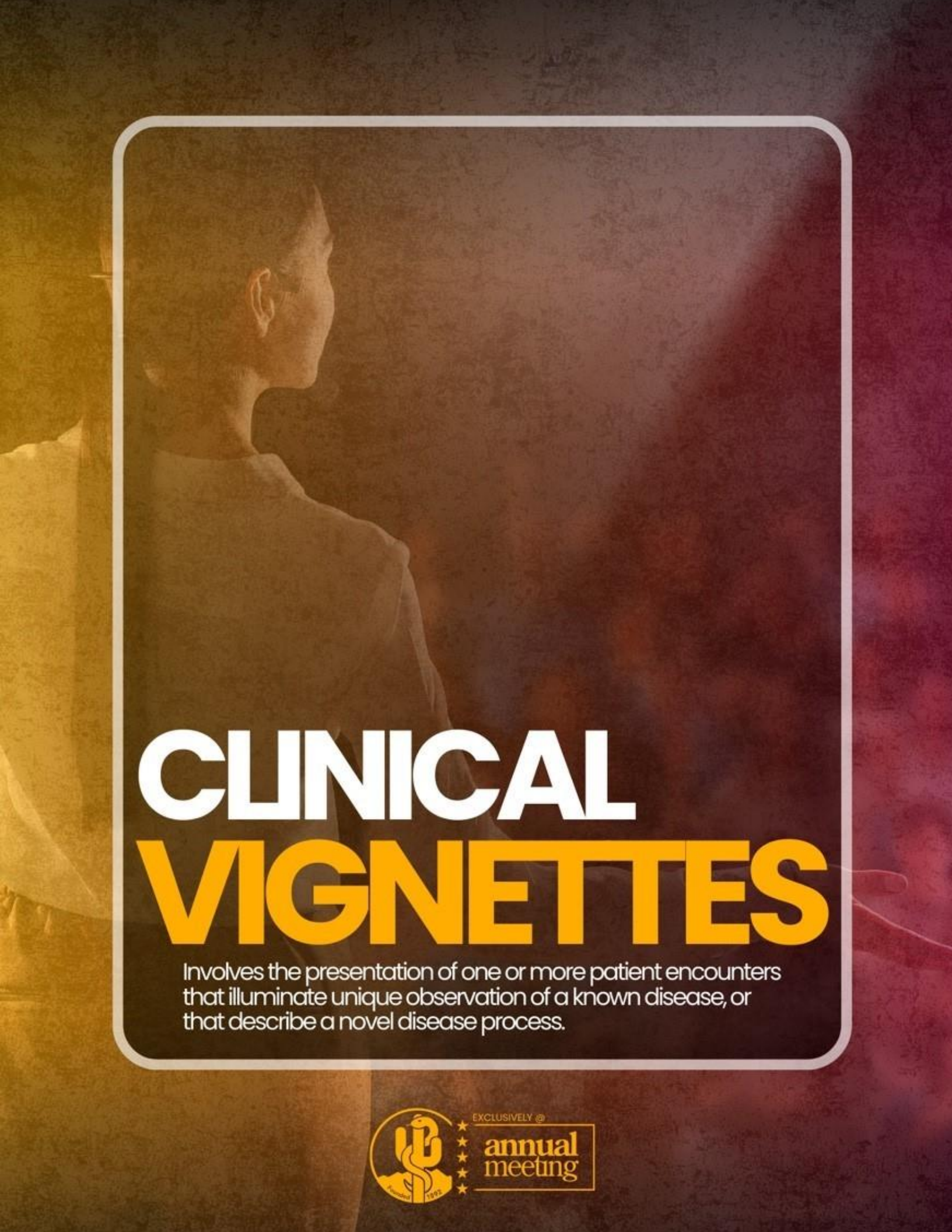

CLINICAL VIGNETTES

Involves the presentation of one or more patient encounters that illuminate unique observation of a known disease, or that describe a novel disease process.

EXCLUSIVELY @ annual meeting

(1) Atypical Presentation of Right Aortic Arch Mirror Image Branching with Associated Vascular Ring

Authors: Ahmed Dudic, Trenton McKinnon, Augustus Malan, Randy Richardson MD.
Affiliations: Creighton University School of Medicine, Phoenix Arizona.

Background: There are several well-documented congenital variations and anomalies of the aortic arch with varying degrees of clinical significance. Persistence of the right fourth branchial arch in aortic embryologic development can cause a right aortic arch (RAA), an uncommon anatomical variant that is present in approximately less than 0.1% of the population. In RAA, the aorta courses anteriorly and to the right of the trachea and can be further classified into several subcategories. A particularly rare variant of RAA is mirror image branching and a vascular ring from either the ductus arteriosus or its remnant, this variant is commonly associated with congenital heart disease or other anomalies such as DiGeorge Syndrome. We present the uncommon case of an infant with RAA with associated mirror image branching and vascular ring that was not associated with any other significant abnormalities.

Clinical Presentation: This patient was diagnosed prenatally with a suspected right aortic arch abnormality and associated vascular ring. There was no known family history of congenital heart disease. The patient was asymptomatic from birth up until at least 11 months of age, but afterward, the patient began to experience recurrent choking episodes when feeding. Surgical correction of her congenital heart defect was eventually pursued and completed at 20 months of age. Pre-operative CTA of the heart confirmed the presence of a right aortic arch with mirror image branching and an associated left-sided ductus bump with narrowing of the mid trachea. Findings were highly suspicious for a vascular ring formed from a ligamentum arteriosum. A vascular ring repair was performed via a left lateral thoracotomy with direct visualization and removal of an atretic ligament. The patient's immediate recovery was complicated by chylous effusion and respiratory failure but she was ultimately discharged home after two days in stable condition.

Clinical Relevance/Discussion: Mirror image branching with an associated vascular ring secondary to a ligamentum arteriosum is an exceedingly rare subtype of Type 1 RAA. Over 75% of RAA cases are associated with some form of congenital heart anomaly but none were observed in this particular case, representing an uncommon presentation of a significantly uncommon RAA subtype. The symptoms in this case were limited to choking exclusively when feeding, which is consistent with previous literature that has emphasized the risk of respiratory distress. The clinical implications of this pathology if left untreated are significant, as aspiration can act as a nidus for respiratory complications and poor feeding has long-term negative implications for overall growth and health. Imaging, whether ultrasound, cardiovascular magnetic resonance or computerized tomography, is a fundamental component in the diagnosis, management, and pre-operative planning of congenital heart defects. The prognosis and outcome of this patient benefited not only from the imaging, but also the close follow-up and appropriate parent education that allowed for early recognition of clinical deterioration and the prompt resolution of symptoms associated with this rare RAA defect.

Figure One

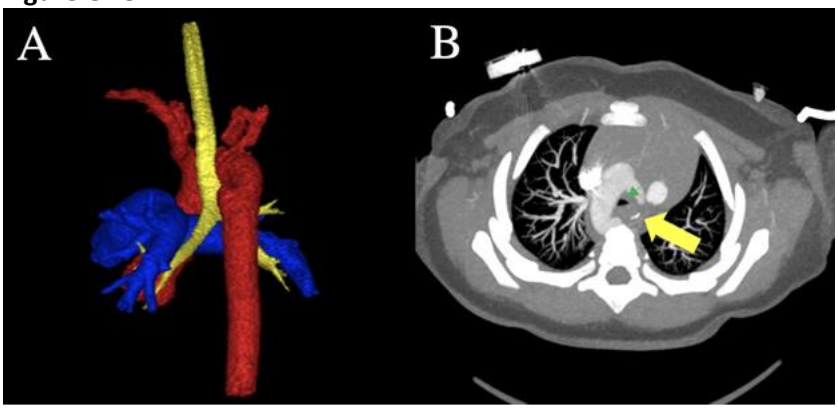

Figure 1: (A) Posterior view of a 3D rendering of CTA imaging demonstrating a right aortic arch with mirror imaging, the vascular ring is not appreciated with this rendering. (B) An axial view of this patient's CTA shows the vascular ring formed by the atretic ligament (yellow arrow) surrounding the esophagus and trachea (green arrow).

(2) Crack the Case: An Athlete at His Breaking Point

Authors: Annie Phan
Affiliations: Arizona College of Osteopathic Medicine, Midwestern University.

Introduction: A 16-year-old male cross-country athlete with celiac disease presents for evaluation of left tibia pain. The patient reports that mild pain began three weeks before presentation. He continued to train without activity modifications. One week later, he reported experiencing increased pain while running in a meet. Due to this pain, he stepped out of the race and was evaluated by the on-site athletic trainer. He was given crutches and advised to present to the clinic for further evaluation. He has pain with ambulation and also notes some swelling of his anterior tibia. Additionally, he notes the pain is worse in the evening while sleeping. There is a family history of "brittle bone disease."
The patient appears younger than age. Height 60 inches, weight 44kg, and BMI 18.98. The sclera are white. Focused exam of the left tibia/leg reveals moderate tenderness at the division of the proximal third and distal two-thirds of the tibial cortex. No deformity noted. Mild soft tissue swelling anteriorly. Unable to perform one leg hop test due to pain. Neurovascularly intact. Range of motion and strength testing of the ipsilateral knee and ankle are normal. Differential diagnoses considered included anterior or medial tibial stress syndrome, tibial stress fracture, exertional compartment syndrome, benign or malignant bone neoplasm, tenosynovitis of the tibialis anterior. X-ray demonstrates acute, slightly impacted transverse nondisplaced transverse fracture of the proximal third of left tibial diaphysis. DEXA scan reveals severe osteoporosis. Total bone mineral density is 4.3 standard deviations below the mean for age and gender, corresponding to the 1st percentile. Normal ESR, CRP, and hemoglobin. Decreased total RBC count with macrocytosis and elevated RDW. Negative celiac panel, normal TSH, free T4, low-normal 25-hydroxy vitamin D 24.2 ng/mL. Normal CMP, lipid panel. Hemoglobin A1c 5.5%.

Clinical Impacts/Relevance and Discussion: This is an unusual and concerning presentation of fracture in an adolescent without significant trauma. Fracture is ultimately deemed pathologic, considering the distinct location and underlying osteoporosis. The known celiac disease prompts concern for malabsorption; however, the negative auto-immune antibody panel indicates excellent disease control. Concern for hormone deficiency or an inherited bone disorder, particularly osteogenesis imperfecta, arose. The patient was referred to pediatric endocrinology, who ultimately referred the patient for genetic testing. Genetic testing was normal. The patient was diagnosed with juvenile idiopathic osteoporosis and recommended to start IV bisphosphonate therapy. The fracture healed appropriately with non-weight bearing, immobilization of the involved extremity in TKO brace, and use of a bone stimulator. After healing appropriately, the patient was referred to physical therapy for range of motion and strengthening. The patient was advised not to participate in contact sports until a notable improvement in bone density was achieved, and endocrinology recommended management. He joined the swim team and can safely continue living an active lifestyle while receiving the appropriate treatment. This case reinforces that physicians should challenge themselves and their colleagues to maintain a practice of curiously and intentionally evaluating each adolescent athlete.


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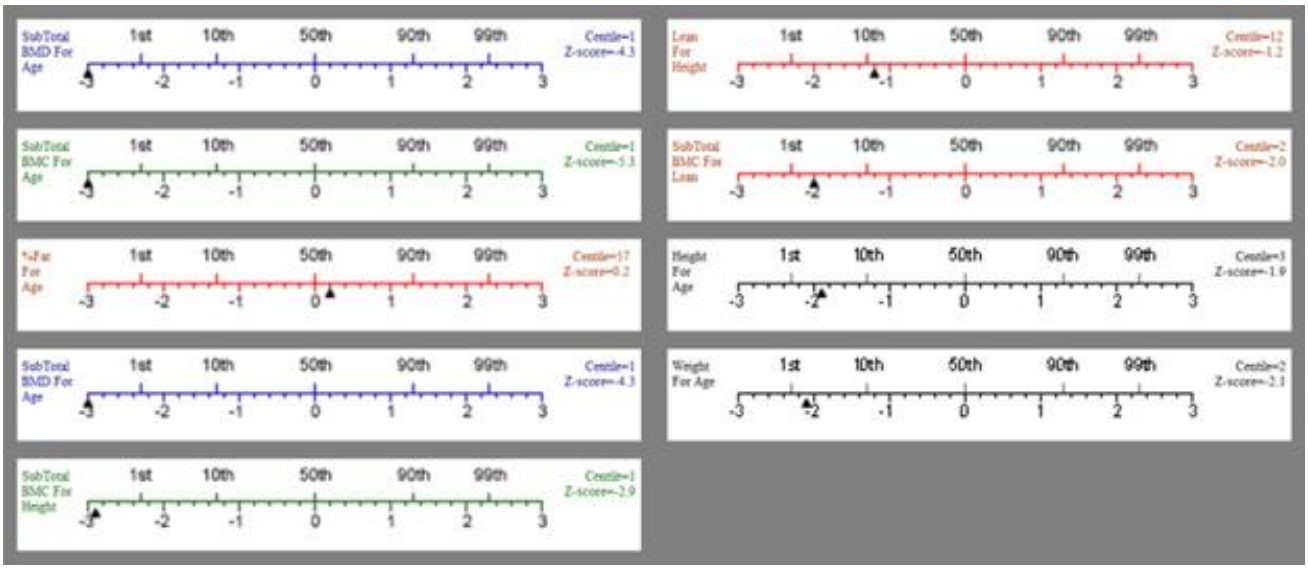
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(3) Extragonadal Endometriosis Presenting as an Appendiceal Mass and Acute Appendicitis

Authors: Jinyoung Ha, OMS-3; Jane Ahn, DO; Nicole Afuape, MD; Erum Azhar, MD, MS PHS, MHQS, CPPS, FACOG.
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Introduction: Endometriosis is defined as normal endometrial glands and stroma outside the uterine cavity.[1,2] Common presentations include pelvic pain, infertility, dyspareunia, and dyschezia. Less commonly, endometriosis may be found in extragonadal, extra-pelvic areas such as the gastrointestinal tract including the appendix.[3] This case report details the rare presentation of extragonadal endometriosis in the setting of acute, atypical right lower quadrant abdominal and pelvic pain.

Case presentation:

- A 45-year-old female presented to the Emergency Department with acute right lower abdominal pain, initially associated with her menstrual cycle.
- The patient had a history of moderate dysmenorrhea and heavy menstrual bleeding.
- On physical examination, vital signs were stable, but she exhibited severe right lower quadrant and pelvic tenderness with guarding.
- Laboratory results revealed an elevated white blood cell count and a CA-125 level of 92.7.
- Diagnostic imaging CT scan (abdomen and pelvis with contrast) revealed an enlarged appendix, acute appendicitis and appendiceal mass, which was further evaluated by an MRI (Figure 1) to rule out other conditions such as malignant masses.
- The patient was treated with antibiotics, and interval surgery was recommended for the appendiceal mass.
- Interval operative laparoscopy was performed, including appendectomy, removal of the appendiceal mass, and right hemi-colectomy.
- Final histopathology confirmed a 2.8 cm endometriotic lesion involving the appendix wall and surrounding tissue (Figure 2).
- The patient subsequently underwent a robotic-assisted hysterectomy, resection of endometriosis, bilateral salpingectomy, left ovarian oophorectomy, and right ovarian cystectomy. Histopathology confirmed stage IV endometriosis.

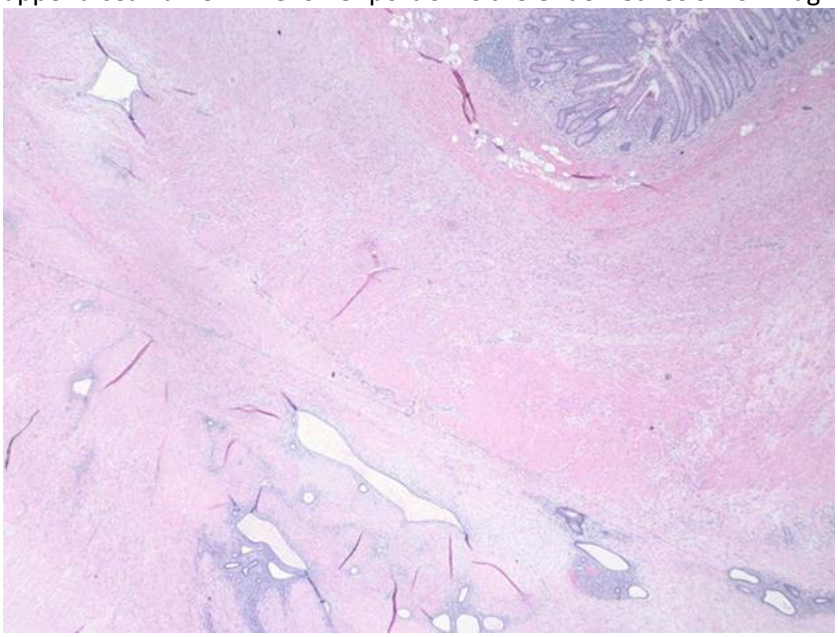
Clinical Impacts/Relevance:

- This case report highlights the rare, atypical presentation of appendiceal endometriosis in the context of acute right lower quadrant pain.
- It underscores the importance of considering endometriosis as a differential diagnosis in reproductive-age women presenting with this type of pain.
- Emergency department physicians and obstetricians/gynecologists should be vigilant in recognizing the diverse clinical presentations of acute right lower quadrant pain.

Discussion: Endometriosis is a common gynecological diagnosis. The most common location of endometriosis is within the pelvis, but rare extra-pelvic endometriosis has been reported in the literature.[4] However, endometriosis of the appendix is a rare diagnosis with a prevalence of 0.4-1% in the general population.[5] Endometriosis of the appendix can have a similar presentation to pelvic endometriosis, including symptoms of dysmenorrhea, deep dyspareunia, and dyschezia. However, there have been case reports of melena, lower GI bleeding, and intussusception.[6] MRI should be the imaging modality of choice locating the mass, developing differential diagnoses, and ruling out other conditions such as malignant masses. Preoperative diagnosis remains challenging, as no reported radiological features describe appendiceal endometriosis and differentiate from appendicitis or appendiceal malignancy.[7] Within the gynecological community, appendectomy is supported if a gross abnormality is found or with persistent right lower quadrant pain alone.[8] Appendectomy without gross abnormality at the time of surgery for endometriosis is lacking supportive prospective data. However, retrospective data supports surgical intervention in an acute setting, given the potential for preventative, diagnostic, and therapeutic benefits.

Figure 1: MRI Showing Appendiceal Mass - shown in arrows

Figure 2. Endometriosis in appendiceal wall and adjacent tissue. The right upper corner is the appendiceal lumen. The lower portion is the endometriosis. 20x magnification



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(4) Insulin-Like Growth Factor 2-Mediated Hypoglycemia in a Patient with Intra-Abdominal Liposarcoma: A Rare Paraneoplastic Syndrome

Authors: Dhairya Shah, Mohees Mohamad Mohamad Horani Mahmood Shahlapour Patrick Lorimer.
Affiliations: Midwestern University - Arizona College of Osteopathic Medicine.

Introduction: Non-islet cell tumor hypoglycemia (NICTH) is a rare paraneoplastic syndrome caused by insulin-like growth factor 2 (IGF-2) secretion from tumors, leading to recurrent hypoglycemia and poor prognosis. We describe a case of hypoglycemia caused by an intra-abdominal liposarcoma producing IGF-2, an unusual and underrecognized condition.

Case presentation: A 42-year-old woman with medical history of abdominal tumors presented with progressive abdominal pain, bloating, presyncope episodes, and recurrent nocturnal hypoglycemia for six weeks. Her blood glucose ranged from 47 to 96 mg/dL, requiring frequent oral intake to stabilize, titrations of diazoxide and octreotide, and dependence on 5% and 10% dextrose fluids. Imaging revealed multiple large abdominal masses, the largest measuring 18 × 9.6 cm, suggestive of sarcomatous lesions. At the time, lab findings demonstrated abnormally low blood glucose (47 mg/dL, 70-99 mg/dL), normal IGF-1 (110 ng/mL, 65-200 ng/mL), elevated IGF-2 (552 ng/mL, 180-580 ng/mL), high IGF-2 to IGF-1 ratio (> 5:1, normally between 2:1 and 3:1), undetectable fasting insulin (< 1 uIU/mL, 2-25 uIU/mL), undetectable C-peptide (< 0.1 ng/mL, 1.1-4.4 ng/mL), hypoalbuminemia (2.4 g/dL, 3.8-5.1 g/dL), and low IGF binding protein 3 (IGFBP-3, 2.7 mcg/mL, 3.3-6.7 mcg/mL). CT-guided biopsy confirmed a liposarcoma as the source of IGF-2 secretion. Resistant hypoglycemia, coupled with lab and biopsy findings, suggested NICTH.

Clinical Relevance & Impact: NICTH is a rare but critical paraneoplastic syndrome that requires early recognition to prevent severe hypoglycemic complications. This case highlights the importance of considering IGF-2-mediated hypoglycemia in patients with unexplained low blood glucose and malignancy. Timely biochemical evaluation, including IGF-1, IGF-2, and IGFBP-3, facilitates accurate diagnosis and management. Given the challenges of resistant hypoglycemia, a multidisciplinary approach is essential for optimal patient outcomes. Increased clinical awareness of IGF-2-secreting tumors can improve early detection and treatment strategies, ultimately enhancing glycemic control and reducing morbidity in affected patients.

Discussion: NICTH arises from tumor-driven overproduction of IGF-2, augmenting glucose utilization and suppressing gluconeogenesis. Persistent hypoglycemia with low insulin and C-peptide levels excludes insulinoma, while high IGF-2 to IGF-1 ratio and low IGFBP-3 supports the diagnosis. Although liposarcomas are rare NICTH etiologies, their link to IGF-2 secretion underscores the need for timely recognition. Management involves glycemic stabilization with diazoxide and octreotide, while definitive therapy entails tumor resection or oncologic interventions. Advanced disease may preclude surgery, highlighting the challenge in managing advanced malignancy. This case highlights the value of a multidisciplinary approach to optimize glycemic control and oncologic outcomes. This is an extremely rare case of IGF-2 secreting NICTH in a patient with intra-abdominal liposarcoma. The case emphasizes one of the more novel causes of hypoglycemia, illustrating the complexity of diagnosing rare syndromes. While hypoglycemia is often recognized in the context of diabetes or islet cell tumors, non-islet cell tumors should also be considered in patients with intra-abdominal malignancy. Furthermore, with

accumulating evidence linking IGF-2 to hypoglycemia and our case demonstrating an association with IGF-2 and IGFBP-3, this supports routine evaluation of IGF-1, IGF-2 and IGFBP-3 in patients with unexplained persistent hypoglycemia.

(5) Linear Immunoglobulin A (IgA) Bullous Dermatosis of Childhood Mimicking Bullous Tinea Infection

Authors: Halen M Heussner, OMS-III, Travis S Lam, DO, Tracy O Middleton, DO, FACOFP.
Affiliations: Midwestern University Arizona College of Osteopathic Medicine; Desert Valley Dermatology, Phoenix, AZ.

Introduction: Linear IgA Bullous Dermatosis (LABD) is a rare autoimmune blistering disorder characterized by linear immunoglobulin A (IgA) deposition along the basement membrane zone (BMZ), detected on direct immunofluorescence (DIF)[1]. The childhood variant, Chronic Bullous Dermatosis of Childhood (CBDC), primarily affects children aged 6 months to 10 years, with the peak onset around 4.5 years[2]. CBDC manifests as intensely pruritic annular clusters of tense vesicles and bullae, often forming a "string-of-pearls" pattern as new blisters form at the periphery of healing lesions. Commonly involved areas include the lower abdomen, perineum, and genitalia. CBDC is frequently idiopathic, but can also be triggered by infections, medications, vaccinations, UV radiation, or malignancy[3-5]. It is often misdiagnosed as bullous impetigo, particularly when it presents atypically. The first-line treatment is dapsone, with sulphapyridine or colchicine used alternatively when dapsone is contraindicated. Supportive care includes antihistamines for pruritis and proper wound management. Corticosteroids are used in severe cases but are generally avoided for long-term treatment. With treatment, most cases resolve by puberty[6].

Case Presentation: A previously healthy 13-year-old boy presented for 2 weeks of severely pruritic, red annular plaques with peripheral vesicles affecting the chest, abdomen, back, and periorbital and cheek regions. He had no significant medical history, without recent medication exposure, infections, or vaccinations. Initial treatment with oral terbinafine and oral doxycycline for bullous tinea and bullous impetigo, respectively, was ineffective, with no improvement after 1 week. A punch biopsy taken from perilesional skin on the back revealed subepidermal blisters and a neutrophilic infiltrate, suggesting either dermatitis herpetiformis (DH) or CBDC. A second punch biopsy was obtained for DIF. Blood tests including CBC, G6PD activity, and tTG IgA were all normal. While awaiting DIF results, the patient was started on a prednisone taper (20 mg daily, reducing to 10 mg daily), but there was no improvement. DIF results confirmed linear IgA deposition along the BMZ, diagnosing CBDC. Dapsone was initiated at 50 mg daily, with weekly bloodwork for monitoring. The patient showed clinical improvement within 2 weeks of starting dapsone, with near complete resolution of both pruritus and lesions by 4 weeks.

Clinical Impacts/Relevance: This case highlights how CBDC can present atypically, defying clinical expectations and complicating diagnosis. It shows that textbook descriptions do not always capture the full spectrum of presentations, potentially leading to misdiagnosis. Specifically, this case demonstrates variability in both age of onset and lesion distribution. For this patient, an incorrect presumptive diagnosis resulted in persistent symptoms, inadequate treatment, additional diagnostic testing, and prolonged discomfort. Since CBDC is highly treatable with excellent long-term outcomes, timely and accurate diagnosis is essential.

Discussion: Atypical presentations of CBDC are often misdiagnosed, leading to delays in appropriate treatment. Clinicians should consider CBDC in the differential diagnosis for pediatric patients presenting

with an abrupt-onset, severely pruritic rash. Histopathological evaluation and DIF are essential for confirming the diagnosis and facilitating timely treatment.

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(6) Rare Case of COVID-19-Associated Coagulopathy

Authors: Jackson White BS, Dalia Khaled BS, Deandra Kuruppu DO, Avtar Singh MD, Kaivan Salehpour MD, Mark Zubriski PhD MD.
Affiliations: Arizona College of Osteopathic Medicine.

Introduction: Coronavirus disease-19-associated coagulopathy (CAC) is a recognized complication of SARS-CoV-2 infection with distinct clinical features, emphasizing the need for early diagnosis and management to improve patient outcomes. Traditionally associated with venous thromboemboli and minimal bleeding symptoms, recent findings suggest an increased bleeding risk in some patients. CAC is characterized by elevated D-dimer and fibrinogen levels while platelet count and prothrombin time remain relatively normal. This contrasts with bacterial sepsis-induced coagulopathy and disseminated intravascular coagulation (DIC), which present with decreased fibrinogen, lower platelet count, and prolonged prothrombin time. The cause of CAC is not fully understood, but it is hypothesized to result from interactions between the inflammatory response to the virus and coagulation pathways at systemic and local levels. This report highlights the importance of physician awareness regarding persistent hemostatic changes in post-COVID-19 patients.

Case Presentation: 71 year old male with PMH of breast cancer in remission, was admitted for severe anemia with a Hgb of 5.1 g/dL and bilateral lower extremity ecchymosis. He noticed bilateral popliteal ecchymosis one month prior, which he subsequently presented to an outside ED and was transfused 1 unit PRBC for anemia. His symptoms resolved afterwards; however, 10 days prior to admission, he developed worsening fatigue as well as bilateral lower extremity swelling and ecchymosis. He denied any melena, hematochezia, hematemesis, or recent trauma. Upon further investigation, the patient reported he contracted COVID-19 just over 1 month ago, prior to the onset of initial symptoms.
Initial workup was significant for Hgb of 5.1 g/dL, elevated fibrinogen 502 mg/dL, and elevated D-dimer of 2.15 ug/mL. Other studies including platelets, WBC, liver enzymes, iron studies, and LDH were all within normal limits. CT abdomen/pelvis without contrast showed no significant findings including gastrointestinal bleeding. The patient required 3 units PRBC before showing improvement and stabilization in his hemoglobin. Evidence of recent COVID-19 infection raised suspicion of CAC and LE doppler revealed a popliteal vein thrombus, elevating suspicion of hypercoagulable state. Hematology was consulted and overall we concluded that the most likely diagnosis at this time was CAC. He would be discharged on oral DOAC after day 3 with a repeat hemoglobin 1 week later was 9.9 g/dL, supporting the idea of a self limited coagulopathy.

Discussion: This case highlights the rare presentation and timeline of COVID-19-associated coagulopathy (CAC). While CAC is commonly associated with acute thrombotic events, such as deep vein thrombosis or purpura fulminans, it is less frequently linked to an acquired coagulopathy with a predominantly bleeding or disseminated intravascular coagulation (DIC)-like phenotype.
In this case, the patient presented with isolated symptoms weeks after a COVID-19 infection, underscoring the importance of obtaining a thorough clinical history. The inherently self-limited nature of the coagulopathy, evidenced by hemoglobin stabilization, suggests that CAC's clinical course can vary significantly, and may present as relapsing, necessitating individualized management strategies. This

report emphasizes the critical need for heightened clinical suspicion and tailored interventions to address the unique hemostatic abnormalities in post-COVID-19 patients.

(7) Coccidioidal Meningitis with Associated Cerebral Vasculitis Causing Recurrent Strokes in an Immunocompetent Patient: A Case Report

Authors: Jacob Less, Zabrina Reyes, Hayley Young, Antonio Moya.
Affiliations: Midwestern University AZCOM; UCLA-Harbor Neurology, Rancho Los Amigos Hospital.

Introduction: To discuss a case of coccidioidal meningitis with associated cerebral vasculitis causing recurrent strokes in an otherwise immunocompetent patient with ambiguous risk factors. Coccidioidal meningitis is a severe, chronic fungal infection of the meninges caused by Coccidioides species, primarily affecting the brain and spinal cord. Coccidioidal meningitis is almost nearly fatal if left untreated, with a death rate of 95% within two years[1]. It is estimated that 0.1% of coccidiomycosis case exposures will develop coccidioidal meningitis[2,3]. In addition to its lethality, cerebral vasculitis complicated by stroke is an increasingly recognized and serious sequela, ranging from 10-40% of cases[4]. Other cases in immunocompetent patients have been reported, but standardized and optimal management has very limited evidence for this uncommon complication[4-6].

Case Presentation: The patient is a 59-year-old male with chief complaint of altered mental status with acute on chronic ataxia. He complained of persistent headaches (with occasional photophobia) and vertigo symptoms for two weeks—later developing ataxia. Initial MRI Brain was significant for acute versus subacute infarct in the left posterior limb of the internal capsule, and trace leptomeningeal thickening and hyperenhancement in the right sylvian fissure. Initial neurologic examination was positive for physiological nystagmus bilaterally in left lateral gaze and mild left nasolabial folding. He had a mildly stiff neck, but negative Kernig and Brudzinski signs. Lateral rotation of the neck resulted in increased dizziness and headache. The rest of the physical exam was unremarkable. From his initial MRI brain, there was a concern for tuberculosis meningitis due to leptomeningeal enhancement on MRI, acute infarct in the left internal capsule, previously seen pulmonary nodules on CT from July 2024, and indolent presentation.

Discussion: He was started on empiric ceftriaxone and vancomycin therapy. Differential included, but was less likely for, coccidioidal meningitis and even less likely cryptococcal meningitis due to his immunocompetent status. A lumbar puncture first showed high WBC count with lymphocytic predominance, hypoglycorrhachia, and elevated protein. He was started on empiric RIPE therapy for suspected TB meningitis and empiric fluconazole for possible fungal meningitis. Workup was otherwise negative until cocci titers returned positive 12 days later in both the serum and CSF. All therapies were discontinued except for fluconazole. Surveillance MRI brain scans showed new punctate acute infarcts in the left putamen and in the right anteromedial lobe, and later in the right posterior frontal corona radiata and periventricular white matter with extension of hydrocephalus

Clinical Impacts/Relevance: Discussion is ongoing for the possible role for adjunct corticosteroids in the treatment of coccidioidal meningitis that is complicated by vasculitis or strokes due to limited evidence. CNS vasculitis is a known complication of coccidioidal meningitis and can happen even in the setting of possible treatment response. While rare and unexpected in an immunocompetent patient, nonspecific meninges-related symptoms and imaging can indicate reasoning enough that coccidioidal meningitis

should remain in the differential and warrant empiric treatment for a patient with altered mental status and overt evidence of meningitis.

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(8) A Complex Case of Gitelman Syndrome: The Role of Comorbidities, Dietary Factors, and Chronic Medication in Exacerbating Electrolyte Imbalances

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Introduction: Gitelman syndrome is the most common salt-wasting tubulopathy, characterized by a sodium-chloride and magnesium reabsorption defect in the distal convoluted tubule (DCT) of the nephron. It is an autosomal recessive mutation in the SLC12A3 and TRPM6 genes, causing excessive sodium and magnesium excretion.[1] This is case of a gentleman with Gitelman syndrome, who presents with hypomagnesemia, hypocalcemia, and hypokalemia. These are frequent laboratory findings along with metabolic alkalosis and hypocalciuria.[2]

Case Presentation: The patient is a 73-year-old gentleman, with a past medical history of asthma, diabetes, GERD, hypertension, arthritis, a 1.8cm lung nodule and possible history of Hepatitis C. The patient was on a proton-pump inhibitor (PPI) for his GERD and reported constant licorice consumption. Along with multiple electrolyte abnormalities, it was noted that he had elevated PTH, and normal Vitamin D levels in his bloodwork. Nephrology confirmed he had a magnesium-wasting tubulopathy consistent with Gitelman syndrome. The patient was prescribed calcium carbonate, magnesium, amiloride, and Aldactone.

Clinical Impacts: The defective electrolyte transporters in the DCT contribute to overall body water volume depletion initiating an increase in sodium reabsorption in the proximal convoluted tubule (PCT). This induces paracellular calcium reabsorption leading to hypocalciuria.[3] Excessive sodium excretion stimulates increased reabsorption via the epithelial sodium channels (ENaC) in the collecting duct creating a negative lumen potential. This drives positively charged potassium and hydrogen ions into the lumen causing hypokalemia and metabolic alkalosis.[1] Symptoms and their intensity can differ significantly from patient to patient, but typically consist of periods of fatigue, muscle weakness, and muscle cramps as well as GI issues such as abdominal discomfort, nausea, and vomiting.[2]

Discussion: Multiple underlying conditions and dietary preferences that may have exacerbated this patient's electrolyte abnormalities. Prolonged PPI used for GERD impairs magnesium absorption in the gut leading to hypomagnesemia.[4] Chronic hypomagnesemia decreases the release of parathyroid hormone (PTH) causing hypocalcemia.[5] Elevated PTH is not commonly seen in Gitelman syndrome, and this may also be attributed to his use of PPIs.[6,7] His normal vitamin D laboratory results indicate that secondary hyperparathyroidism is not the cause of the elevated PTH.[8] Excessive licorice intake can induce hypokalemia due to pseudohyperaldosteronism, a condition caused by the active ingredient in licorice: glycyrrhizin. This ingredient inhibits 11-B hydroxysteroid-dehydrogenase, diminishing the conversion of cortisol into its inactive metabolite cortisone. Excess cortisol binds to mineralocorticosteroid receptors in the collecting duct producing similar effects to the potassium-wasting hormone, aldosterone.[9,10] The treatment plan includes correcting the hypokalemia via restricting licorice intake and starting potassium-sparing diuretics. It also included correcting the low magnesium by avoiding PPI intake in addition to slow-releasing magnesium. The low calcium was corrected through the ingestion of calcium carbonate.[11]

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(9) Pulmonary Point of Care Ultrasound: A Case Series

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Introduction: Pneumonia remains a leading cause globally of hospitalization and mortality emphasizing the need for efficient, accurate, and cost-effective diagnostic methods. Point-of-care ultrasound (POCUS) is increasingly recognized as a valuable method for rapid assessment and diagnosis of pneumonia, offering high sensitivity and specificity while eliminating radiation exposure.[1,2,3,4] Readily available in our outpatient university clinic, POCUS provides a convenient and cost-effective alternative to chest radiography (CXR), enabling bedside evaluation of acute respiratory symptoms. As its clinical utility expands, this case series explores three cases in which the efficacy and advantages of POCUS played a fundamental role in the clinical course.

Case Presentation: The first patient presented with six days of fever, headache, dry cough, pleuritic chest pain, and cervical lymphadenopathy with clear lung sounds on examination. POCUS revealed B lines in the left upper lung fields. Given the patient's risk factors for coccidioidomycosis, a CXR was performed, confirming consolidation in the left upper lobe. The patient was treated with antibiotics and fully recovery. The second patient had a nine-day history of fever, productive cough, and sinus pressure. HEENT and pulmonary exams were unremarkable. Rapid COVID testing was positive, and POCUS showed normal A lines ruling out pneumonia. The patient received antiviral treatment, as bacterial infection was ruled out. The third patient presented with two weeks of productive cough, dyspnea, and chills. Reduced breath sounds and crackles were noted bilaterally. POCUS revealed B lines bilaterally, supporting the diagnosis of atypical pneumonia. The patient was treated with antibiotics and showed improvement.

Clinical Impacts/Relevance: POCUS played a key role in distinguishing interstitial disease by identifying B lines while ruling out other etiologies with normal A lines. By implementing POCUS, outsourcing for CXR's is reduced, sparing additional costs. Integrating POCUS along with clinical correlation, providers can streamline care, optimize resources, and avoid delays in appropriate therapy while supporting antimicrobial stewardship by minimizing unnecessary antibiotic use. Additional benefits include real time imaging capabilities, bedside accessibility, and the ability to monitor disease progression in the outpatient setting making it an essential tool for rapid pulmonary assessment.

Discussion: POCUS is valuable in rapidly diagnosing pulmonary infections and guiding clinical decision-making as demonstrated above. The current diagnostic gold standard for pneumonia is CXR providing a sensitivity/specificity of 0.65 and 0.81 respectively[5]. POCUS shows an increased sensitivity and specificity respectively at 0.96 and 0.85 suggesting that POCUS may be a better imaging modality especially in elderly, pediatric, and gravida populations. Current limitations include operator dependence on skill and experience. While physicians are increasingly adopting ultrasound into their clinical practice, physicians introduced to POCUS earlier in their education express greater confidence in performing and interpreting ultrasound images[6]. A 2022 survey of 36 Colleges of Osteopathic Medicine revealed that 100% of respondents incorporate ultrasound particularly within first year anatomy courses highlighting

the growing role of ultrasound in clinical practice[7]. As the use of POCUS continues to expand, it is set to significantly impact the outpatient setting in the diagnosis and management of pneumonia.

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(10) Managing Morgellons Disease in a Plastic Surgery Clinic – A Multidisciplinary Approach

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Introduction: Morgellons disease (MD) is a controversial and poorly understood condition marked by patient-reported skin fibers, chronic lesions, and abnormal sensations such as crawling or stinging. Its classification remains debated, with theories suggesting infectious, autoimmune, or psychodermatologic origins such as delusional parasitosis. Patients often seek removal of perceived foreign materials or correction of structural abnormalities. This case underscores an approach to evaluating MD in a plastic surgery setting, focusing on surgical decision-making, patient education, and referrals.

Case Presentation: A 42-year-old female with history of rheumatoid arthritis, chronic pain, and polysubstance use presented with progressive scalp ridges, ear abnormalities, and visible skin fibers. She also requested removal of perceived "wires" in her ears. As per patient, her symptoms began in 2017 when she started to experience crushing migraines, auditory hallucinations, and tooth loss after substance use relapse. Symptoms progressed for years despite cessation of substances. In 2021, patient noted deepening occipital ridges, puncture wounds, and hair loss behind her left ear. She also reported that while shaving her head, she cut what was described as a wire-like structure protruding from her mastoid. She believes that removing this “wire” improved her vision and mental clarity thereafter. A 2022 CT scan revealed skull abnormalities resembling temporal bone disease or possible crush injury. There was no reported history of head injury. She currently experiences chronic head pain (3/10 at baseline, 7/10 in cold weather) and describes wire-like bands across her occiput connecting her ears. She has attempted topical treatments (salicylic acid, AHA, vitamin C) with partial improvement in skin lesions containing fibers.

Clinical Impacts/Relevance: T Managing MD in plastic surgery requires a multidisciplinary approach balancing patient concerns with evidence-based care. Determining surgical necessity is challenging, especially when distinguishing structural pathology from perceived abnormalities. Without functional impairment, non-healing wounds, or a correctable defect, surgery is not advised. However, therapeutic relief of distressing symptoms and ruling out underlying pathology becomes crucial via collaboration with specialists. Dermatologists can assess skin findings, biopsy lesions, rule out self-inflicted trauma, dermatologic disorders, or external contaminants. Neurologists can evaluate head pain, sensory disturbances, and auditory hallucinations for potential neuropathic or structural origins. Psychiatric evaluation should be considered due to the patient’s history of substance use, hallucinations, and fixation on foreign material. However, psychiatric referrals must be introduced sensitively to maintain therapeutic rapport.

Discussion: Successful communication is key when addressing MD in surgical settings. A non-confrontational approach that validates distress without reinforcing delusions is most effective. Physicians should explore all possible explanations while emphasizing symptom relief. Neutral and supportive language fosters trust and encourages patient engagement in comprehensive care rather than fixation on surgery. Plastic surgeons must assess the necessity of surgery, differentiate pathology from perception, and coordinate specialist referrals. By guiding patients toward evidence-based

treatment and avoiding unnecessary procedures, plastic surgeons contribute to effective MD management while maintaining patient confidence.

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(11) Atypical Compartment Syndrome from Non-Necrotizing Cellulitis

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Introduction: Acute compartment syndrome (ACS) occurs when increased pressure within a closed muscle compartment compromises blood flow, leading to ischemia and necrosis if not treated with emergent fasciotomy. It typically results from trauma but can arise from non-traumatic causes such as restrictive dressings, rhabdomyolysis, or infections. Cellulitis, a common bacterial infection, is a risk factor for ACS due to the significant edema and tissue inflammation it induces. This report presents a rare case of atraumatic ACS in the anterior compartment of the lower leg secondary to non-necrotizing cellulitis.

Case Presentation: A 62-year-old male with Parkinson's disease, type 2 diabetes mellitus, depression, chronic constipation, and benign prostatic hyperplasia was admitted for left lower extremity (LLE) cellulitis after failing outpatient cephalexin. He was started on IV vancomycin and ceftriaxone. Despite initial improvement in cellulitis, he experienced severe, constant LLE pain (9/10), exacerbated even by light touch. Venous duplex ultrasound ruled out a deep venous thrombosis, but CT imaging demonstrated hypodensity and muscle enlargement, raising concern for ACS and myonecrosis. Surgical consultation led to an emergent fasciotomy, which confirmed myonecrosis. Postoperatively, the patient experienced bleeding but remained stable. His pain significantly improved, and he underwent repeat debridement with placement of a wound vacuum. After 14 days of IV antibiotics, he was discharged to a rehabilitation facility.

Clinical Impact/Relevance: This case underscores the need for heightened clinical suspicion for ACS in patients with concurrent cellulitis and severe pain to innocuous stimuli. Clinicians must maintain a low threshold for diagnostic evaluation, as timely recognition and intervention are crucial for preventing limb-threatening complications and irreversible myonecrosis from ACS.

Discussion: ACS is a well-recognized surgical emergency, typically resulting from trauma, but its occurrence secondary to non-necrotizing cellulitis is rare. The pathogenesis involves an exaggerated inflammatory response, leading to increased capillary permeability, edema, and compartment pressure elevation. Unlike traumatic ACS, where direct injury increases pressure, cellulitis-associated ACS develops through severe inflammatory changes. ACS most frequently affects the anterior compartment of the lower leg due to its inelastic fascial boundaries and comparatively higher resting compartment pressure. Risk factors include diabetes, immunosuppression, peripheral vascular disease, and infections with virulent organisms such as Streptococcus pyogenes or Vibrio vulnificus. These conditions can lead to excessive inflammation, impaired lymphatic drainage, and delayed healing, increasing the risk of ACS. Diagnosing ACS in cellulitis cases is challenging since both conditions cause pain and swelling, potentially delaying recognition. However, pain out of proportion to examination should prompt early evaluation. When suspicion arises, compartment pressure measurements via needle manometry are the gold standard for diagnosis. In unclear cases, MRI may provide additional evidence to justify pressure testing. After diagnosis, emergent fasciotomy is definitive treatment to prevent irreversible ischemic damage.

Figure 1. Left lower extremity skin findings:

Figure 2: Left lower extremity initial fasciotomy:

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(12) Transformation of Low Grade MDA into AML in a Lung Transplant Recipient: Never a Straight Road in Transplant?

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Introduction: Lung transplant (LTx) carries several risks but remains the only definitive treatment for end stage lung disease. Although there is a documented increase in many neoplasms, mainly lymphoproliferative disorders and skin cancer, there are rarely cases of developing hematologic malignancies post-LTx [1,2] . Given their nonspecific presentation and lethality, providers should always consider hematologic malignancies when evaluating post-LTx patients. Here, we present a case of post-LTx acute myeloid leukemia (AML) **t**hat evolved from MDS in a patient who's recovery was complicated by many infections.

Case Presentation: A 72 year old male with a history of anemia, GERD, and coccidioidomycosis underwent bilateral LTx with cryoablation for combined pulmonary fibrosis and emphysema (CPFE). Surgery was complicated by post operative bleeding, PGD grade 3, and hypoxia requiring prolonged inpatient rehab. His initial therapy regimen included basiliximab induction, tacrolimus, prednisone, and mycophenolate mofetil (MMF). Two months post transplant, he presented to the ED from acute rehab due to acute hypoxic respiratory failure including altered mental status, prompting ICU admission. While undergoing treatment, routine laboratory measurements demonstrated pancytopenia (WBC 2.2 thousand/uL) that persisted despite repeated transfusions. For the next month, his pulmonary function remained stable, but he still experienced persistent fatigue and additional infections including septic fungal and bcaterial pneumonia. Repeat labs demonstrated pancytopenia again (WBC 0.7-1.1 thousand/uL), prompting bone marrow biopsy (BMBx) that revealed myelodysplastic syndrome (MDS). MMF was immediately discontinued, and luspatercept was started for management of MDS. His condition was further complicated by concomitant MRSA bacteremia and MRSA endocarditis. Despite treatment over a few months, his refractory pancytopenia worsened (WBC 1.7 thousand/uL), and another BMBx was performed that demonstrated AML with MECOM rearrangement [1] . He underwent numerous rounds of chemotherapy and eventually died eleven months post transplant and three months post AML diagnosis.

Clinical Impacts & Discussion: This rare case of AML following LTx was especially difficult to identify given nonspecific presentation and associated severe infections. Some hypothesize that topoisomerase II inhibitors could be related to MDS/AML in patients post-LTx [1,2] , but little remains known about this diagnosis in the transplant setting. However, we do know the prognosis is dismal with an average survival of 3.5 months post-transplant [1] . Altogether, this case highlights the complexity of diagnosing and treating hematologic malignancies post-LTx.

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(13) Bilateral External Auditory Canal Duplication: A Rare Congenital Anomaly

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Introduction: Branchial cleft anomalies are quite common, constituting approximately 30% of all congenital neck masses, most often presenting in early adulthood or childhood with no partiality to either sex.[1-3] First branchial cleft anomalies, however, are much rarer, constituting 1-8% of all branchial cleft anomalies, with an estimated 1 in 100,000 being affected.[4-5] These anomalies can result in a variety of cysts, sinuses, cartilaginous remnants, and fistulae in the preauricular, postauricular, parotid, and upper neck areas. They are clinically significant given their propensity to become infected. First branchial cleft anomalies may present as duplications of the external ear canal. Literature is characterized by few examples of unilateral external ear canal duplication, yet there have not been any reported cases of bilateral external ear canal duplication, to the best of our knowledge. Herein, we report a Type I first branchial cleft anomaly, characterized by bilateral external ear canal duplication.

Case Presentation: An eight-year-old female patient presented with bilateral external ear canal duplication and a history of recurrent postauricular abscesses, otorrhea, and moderate left-sided conductive hearing loss. Previous incision and drainage of the postauricular abscesses yielded little long-term success. Medical history was otherwise unremarkable. Physical examination revealed a cystic mass in the right ear and postauricular fibrosis, likely a result of previous surgical interventions. An audiogram revealed asymmetric hearing function, with mild-to-moderate conductive hearing loss in the left ear contrasting normal hearing in the right ear, while tympanometry confirmed an intact right tympanic membrane but was precluded on the left due to purulent otorrhea. A head CT scan revealed postauricular soft tissue swelling and well-pneumatized mastoid air cells. Both ears were explored intraoperatively via postauricular incisions. Surgical excision included removal of a cyst, cartilaginous remnants, and fibrotic tissue. The patient was followed up to assess for postsurgical complications. The surgical site healed uneventfully; no new symptoms or recurrences of past symptoms of otorrhea, cyst formation, or abscesses, had developed within the twelve weeks post-surgery.

Clinical Impacts/Relevance: Head and neck surgeons must recognize rare presentations such as this one to ensure accurate and timely diagnosis. Early diagnosis reduces the risk of iatrogenic injury, such as facial nerve damage or incomplete resection, which increases the likelihood of recurrence. The literature suggests a high recurrence rate for first branchial cleft anomalies, with an average of 2.4 procedures required for complete removal. Prompt intervention with complete surgical excision may protect patients from infectious complications, such as cyst formation and abscesses.

Discussion: First branchial cleft anomalies are uncommon, accounting for only 1–8% of all branchial cleft defects, with external auditory canal involvement being even rarer. Most documented cases are unilateral, and bilateral external ear canal duplication has not been well characterized in the medical literature to date. Given the potential for diagnostic uncertainty, incomplete resections, and facial nerve

injury, this case underscores the need for increased awareness and early intervention among otolaryngologists.

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(14) A Case of Vision Changes After Endoscopy With General Anesthesia

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Introduction: It has been estimated that over 57 million endoscopies are performed yearly in the United States, with about 37% of these under general anesthesia [1,2]. Though uncommon, vision changes after this procedure may occur. Here, we present a case of visual complaints following an endoscopy done under general anesthesia.

Case presentation: A 62-year-old male with history of type 2 diabetes mellitus, hypertension, obstructive sleep apnea on continuous positive airway pressure therapy, and chronic obstructive pulmonary disease presented for endoscopy under general anesthesia and experienced cardiac arrest during the procedure. Return of spontaneous circulation was regained after a round of chest compressions and epinephrine. Two weeks later, he presented to the ophthalmology clinic for constant brown spots in his vision. Best corrected visual acuity was 20/20 and intraocular pressure was 17 in both eyes. On dilated fundus exam (DFE), the patient was noted to have radial reddish-brown lesions around the fovea bilaterally and diagnosed with acute macular neuroretinopathy (AMN). At a follow-up visit 1 month later, patient reported resolution of the scotomas. DFE showed trace areas of brownish lesions located inferotemporal to the fovea. The patient had also undergone visual field testing, which was within normal limits for both eyes.

Clinical impact/relevance: No cases of AMN have been described in association with endoscopy or general anesthesia.

Discussion: AMN is a condition that affects the outer retinal layers of the eye and typically affects white females in their 30s. [3] Though the pathophysiology is still being studied, it is believed to be a result of decreased blood flow to the deep retinal capillary plexus of the eye, resulting in damage to the photoreceptors. [3] Patients typically present with decreased visual acuity and paracentral scotomas, which may be transient or permanent. [3] We found two reports of decreases in vision after endoscopy, one of which was caused by Valsalva retinopathy that was identified one day after the procedure. [4] The other was a case series of four patients who developed corneal abrasions after undergoing endoscopy. [5] Perioperative vision loss (POVL) has also been reported, most commonly after cardiac and spinal surgeries. [6] Causes can vary across a spectrum from a simple corneal abrasion to a vision-threatening central retinal artery occlusion. The most common cause for POVL is ischemic optic neuropathy, in which blood supply to the optic nerve is compromised. [6] In our case, the AMN could have been caused by prolonged hypoperfusion from cardiac arrest and subsequent decreased perfusion of the retinal capillary plexus. Furthermore, the patient had preexisting diabetes mellitus and hypertension, which can prevent adequate compensatory responses of the blood vessels to fluctuating blood pressures due to dysfunction of vascular endothelial autoregulation. [7] This may have predisposed him to be more susceptible to decreased perfusion of the retinal microvasculature. AMN can be a differential diagnosis for vision loss after endoscopy under general anesthesia. Awareness of

such postprocedural ocular sequelae is important, as it can help prepare and inform physicians' next steps.

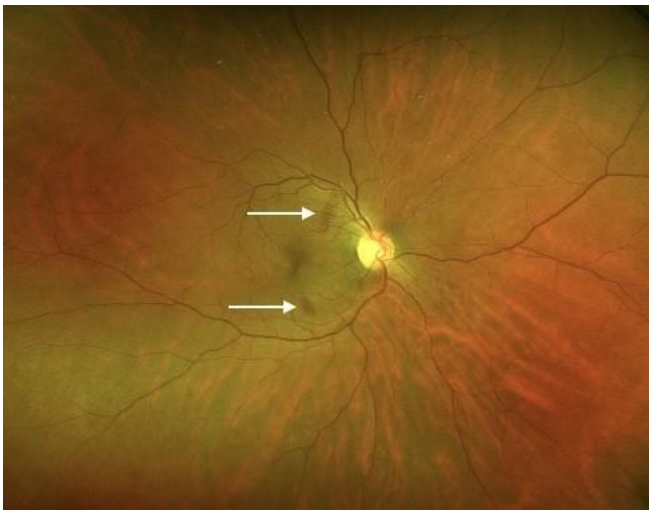

Figure 1. Wide-angle fundus photograph (Optos) of the right eye demonstrating reddish-brown lesions pointing towards the fovea (white arrows).

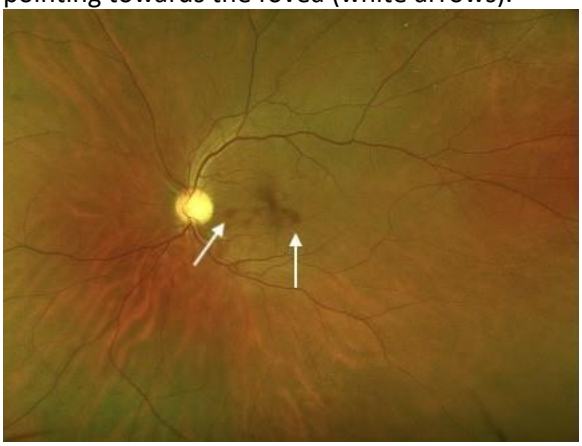

Figure 2. Wide-angle fundus photograph (Optos) of the left eye demonstrating reddish-brown lesions pointing towards the fovea (white arrows).

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(15) Spontaneous Uterine Rupture with Concurrent Uterine Vessel Rupture and Massive Hemoperitoneum Following Non-Operative Vaginal Delivery: A Rare Case Report

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Objectives:

- Highlight the critical importance of early recognition and management of postpartum hemorrhage due to uterine rupture in patients without a history of uterine surgery.
- Enhance understanding of the diagnostic and therapeutic challenges associated with uterine rupture in an unscarred uterus, emphasizing the pivotal role of multidisciplinary care in optimizing maternal outcomes

Introduction/Background: Postpartum hemorrhage (PPH) remains one of the leading causes of maternal morbidity and mortality worldwide, with early identification and timely intervention crucial for improving outcomes [1]. One serious cause of PPH is a uterine rupture. Overall uterine rupture rates are 1 in 1,235-4,366, with primary uterine rupture estimated at around 1 in 16,840-19,7654 in developed nations [2,3]. This can be a cause of life-threatening postpartum hemorrhage (PPH) and typically occurs in the presence of prior uterine surgery. Its occurrence in an unscarred uterus presents unique diagnostic and therapeutic challenges. Management of uterine rupture often requires a multidisciplinary approach involving obstetricians, anesthesiologists, and surgical teams, particularly when facing complex complications such as uterine trauma or vascular injury.

Case Description:

- Patient was a G4P2012, 38W6d who presented with spontaneous rupture of membranes, which was augmented with oxytocin. She delivered a healthy baby boy but experienced postpartum hemorrhage, initially managed with IM Methergine, Pitocin, Cytotec, and uterine massage.
- The patient became light-headed and less responsive, with uterine atony and significant blood loss. Her hemoglobin dropped from 11.5 to 7.4, and her systolic blood pressure fell to the 30s. Norepinephrine was administered, and a rapid response team was called for a mass transfusion protocol, resulting in 18 units of PRBC, 12 units of FFP, three units of cryoprecipitate, and three units of platelets.
- The patient was taken for an emergent exploratory laparotomy, revealing a posterior uterine rupture involving the posterior venous plexus. A supracervical hysterectomy was performed, with general and vascular surgery called in to assist in controlling the venous avulsions.

- The patient was then transferred to another nearby medical center's interventional radiology team, where another laparotomy was performed to remove packing and address ongoing bleeding.
- Postoperatively, she developed an ileus and required an NG tube. The patient stabilized and was discharged on day seven.

Discussion:

- This case presents a rare and life-threatening postpartum hemorrhage due to posterior uterine wall rupture in a patient without prior uterine surgery. It emphasizes the need for early recognition and immediate intervention to optimize maternal outcomes.
- The primary work-up included imaging and laboratory tests to rule out other causes of postpartum hemorrhage, such as uterine atony, retained placenta, and cervical lacerations. Uterine rupture was confirmed through exploratory laparotomy after other potential diagnoses were excluded.

Outcomes/Conclusion:

- Uterine rupture, though traditionally linked to prior uterine surgery, can also occur in an unscarred uterus, as demonstrated in this rare case.
- In the setting of postpartum hemorrhage complicated by pain and hemodynamic instability, uterine rupture should be considered in the differential diagnosis and managed with prompt, decisive intervention.

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(16) Delayed Presentation of Complete Heart Block after Transcatheter Aortic Valve Replacement

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Introduction: Transcatheter Aortic Valve Replacement (TAVR) has become a mainstream alternative treatment for severe aortic stenosis in patients at heightened surgical risk[1]. One of the known complications of TAVR are atrioventricular conduction abnormalities (AVCA), most commonly new onset Left Bundle Branch Block (LBBB) and various degrees of AV blocks[2]. Patients with this complication present in the acute recovery period with lightheadedness, dizziness, dyspnea, or palpitations. Although AVCA usually occurs acutely, delayed presentations one year after TAVR have been described, but are rare[3].

Case Description: A 69-year-old male, history of hypertension, coronary artery disease, hyperlipidemia, and severe aortic stenosis, one year s/p TAVR, presented to the emergency department for lightheadedness, dizziness, and presyncope. His symptoms have been progressively worsening for two weeks and are worse with exertion. He was seen the day prior in Cardiology clinic for his symptoms and placed on a 7-day cardiac monitor. Over the next 24 hours, the patient's monitor recorded 2 prolonged pauses consistent with a high degree AV block. Given this patient's reported symptoms and monitor findings, he was further evaluated in the ED. Vitals noted for intermittent bradycardia, 55 bpm, and hypertension, 162/96 mmHg. Patient presented in no acute distress with regular rhythm on exam. Pulses were symmetrical and lungs were clear bilaterally. ECG revealed a sinus rhythm with LBBB. No recurrent high degree AV block occurred while in the ED. Serum electrolytes were unremarkable. Patient was evaluated by Cardiology and diagnosed with complete heart block (CHB) based on his findings on his cardiac monitor over the interval 24 hours. Medication and ischemic heart disease as alternate etiologies were ruled out as patient was not taking beta or calcium channel blockers, and his most recent echocardiogram revealed no structural abnormalities. He was admitted for permanent pacemaker implantation (PPM) and 24-hour monitoring. Discharged the following day in stable condition.

Clinical Impacts: The increased utilization of TAVR escalates the incidence of AVCA in patients treated for aortic stenosis. This case highlights the importance of identifying risk factors and symptomatology of CHB after TAVR. A provider's suspicion for the development of arrhythmias should extend past the acute post operative period into years post TAVR. Consistent follow up after TAVR is imperative to monitor symptoms and to prevent sudden cardiac death.

Discussion: AVCA is one of the five major complications of TAVR and impacts quality of life and mortality[4,5]. The mechanism involves mechanical stress, inflammation, and ischemia disrupting the heart's electrical conductivity[2]. Diagnosis is made through ECG and telemetry, and treatment is PPM. AVCA typically present shortly after TAVR and are treated during the initial hospitalization. Although new onset LBBB can precipitate CHB and PPM, one study found that only 6.7% of TAVR patients were diagnosed with CHB after discharge[6]. CHB more than one month after TAVR is a rare exception[7]. In patients with risk factors for CHB like LBBB, male sex, and valve prothesis type, recent data suggests continuous cardiac monitoring and early PPM to reduce mortality[8].

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(17) Drug-Induced Liver Injury Secondary to Endocrine Therapy with Aromatase Inhibitor: A Case Report

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Introduction: Aromatase inhibitors (AI) are a class of drugs commonly used in adjuvant endocrine therapy for the treatment of estrogen receptor (ER) positive breast cancer in postmenopausal women [1]. Common side effects of AI use include hot flashes, osteoporosis, arthralgias, fatigue, musculoskeletal pain, and hyperlipidemia [2-3]. We present the case of a 76-year-old female who presented with hepatotoxicity after initiating endocrine therapy with anastrozole for ER positive lobular carcinoma in situ (LCIS), enhancing understanding of AI risks and side effects.

Case Presentation: A 76-year-old female with hypothyroidism and dyslipidemia presented after diagnostic mammogram demonstrated BIRADS Category 4b indeterminate microcalcifications in the left retroareolar region. Subsequent biopsy and lumpectomy showed 3.5 mm pleomorphic LCIS with ER 100%. The patient was offered endocrine therapy to reduce risk of recurrence and was started on anastrozole 1 mg daily. Within days of initiating anastrozole, the patient reported weakness, loss of appetite, and darkening urine. Two weeks after initiating anastrozole, the patient developed jaundice and was admitted to the hospital. Laboratory values demonstrated hyperbilirubinemia, elevated alkaline phosphatase (ALP), and elevated liver function tests. Due to the timeline of hepatotoxicity after initiating anastrozole and extensive unremarkable workup, anastrozole was determined to be the source of the hepatic injury and was held. Two months after holding anastrozole, the patient's symptoms resolved, and repeat laboratory values demonstrated mildly elevated bilirubin and ALP. After discussing the risks of continuing endocrine therapy, the patient agreed to proceed with routine observation.

Clinical Impact/Relevance: This rare case of hepatotoxicity induced by anastrozole broadens understanding of the side effects and risks of AI. Discontinuation of anastrozole resulted in improvement of liver function tests, and the patient decided to proceed with regular observation. This case reinforces the importance for recognition and diagnosis of hepatic injury, especially with limited documented cases of drug-induced liver injury (DILI) with AI.

Discussion: DILI is a spectrum of hepatotoxicity caused by medications or supplements. Diagnosis can be challenging as it may present similarly to other causes of inducible hepatotoxicity, notably autoimmune hepatitis (AIH), with symptoms such as fatigue, weakness, dyspnea, jaundice, abdominal pain, and altered mental status [4]. Timing of hepatotoxicity is critical, as hepatic injury from AIH does not demonstrate an association to initiating therapy [5-7]. Third generation AI block the enzyme aromatase from converting androgens to estrogen, reducing estrogen production [3, 5]. Common side effects of AI include hot flashes, mood changes, decreased bone density, hyperlipidemia, arthralgias, fatigue, and musculoskeletal pain [2-3, 5-6]. Management of DILI involves removal of the offending agent with possible glucocorticoid adjunct, as hepatic injury is typically reversible with resolution of symptoms and return of liver function enzymes to normal limits within one to two months [6-8]. Subsequent management with endocrine therapy is poorly understood, but should include considerations regarding risk of DILI, side effect profile, and risk for recurrence and metastasis. After discussion, our patient accepted the risk of recurrence and chose routine observation.

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(18) Jaw Pain: A Rare Presentation Of Metastatic Colon Cancer

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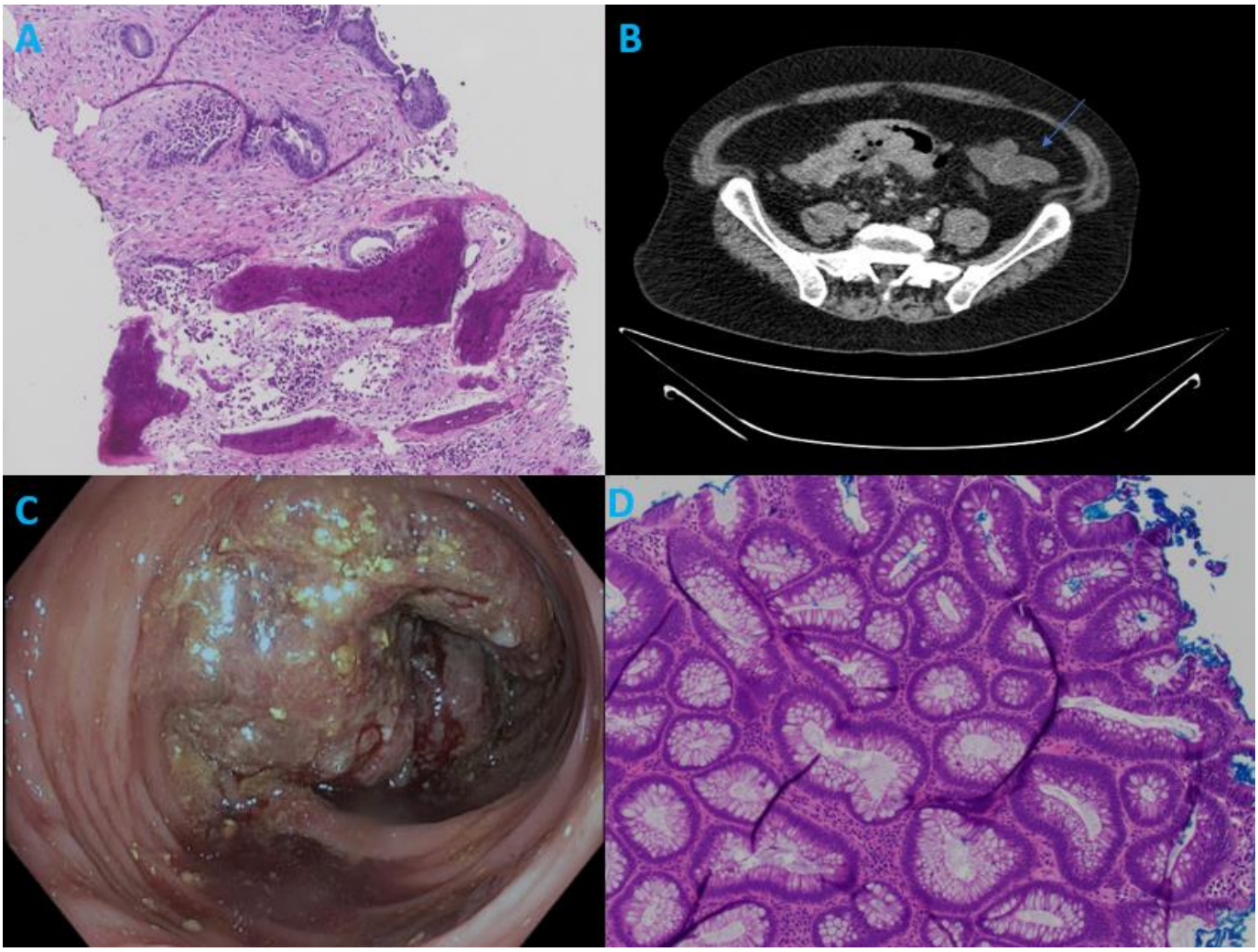
Abstract: Approximately 153,000 new cases of colon cancer are diagnosed annually. Patients can be asymptomatic, or manifest symptoms including change in bowel habits, rectal bleeding, rectal mass, iron deficiency anemia or abdominal pain. Rarely, patients can be asymptomatic but have metastatic disease and present with symptoms related to distant metastasis. We present a case of 57 years male who presented with jaw pain and diagnosed with metastatic colon cancer.

A 57-year-old male presented to the hospital for jaw pain. He never had any pertinent past medical history. He reported having altered bowel habits for last few years. He denied any abdominal pain, hematochezia or weight loss. Last colonoscopy was normal seven years ago. There was no family history of colon cancer. Pertinent labs include leukocytosis 11400/uL, mild normocytic anemia with hemoglobin of 12g/dL, AST 153 IU/L, ALT 109 IU/L, alkaline phosphatase 317 IU/L, and total bilirubin of 1.8mg/Dl.

He underwent a computerized tomography (CT) scan of neck and found to have a large soft tissue mass with associated bone destruction involving the right mandible. Ultrasound (US) guided biopsy showed malignant cells staining with cytokeratin AE1/3, CDX2 and SATB2 concerning for metastatic adenocarcinoma favoring colon as primary site **(Figure A)**. CT abdomen showed thickening with stranding of sigmoid colon concerning for possible underlying neoplasm and multiple low-attenuation lesions throughout the liver likely representing metastatic disease **(Figure B).** CEA was 1666 ng/mL. Colonoscopy was done and showed a 10cm fungating partially obstructing mass in the sigmoid colon **(Figure C).** Biopsy confirmed the invasive poorly differentiated adenocarcinoma **(Figure D).** Immunohistochemistry testing for mismatch repair proteins including MLH1, MSH2, MSH6, and PMS2 showed intact nuclear expression. Colorectal surgery team deferred any surgical intervention given metastatic disease. He was started on FOLFOX/Avastin after discharge and his CEA was trending down to 873ng/mL on follow up visits.

There is a global epidemiologic trend towards early onset colorectal cancer. Efforts to reduce the incidence and mortality of early onset colorectal cancer include assessing for potential modifiable risk factors, identifying individuals eligible for earlier surveillance, and promoting both clinician and patient awareness of the potential symptoms associated with CRC and screen patient with atypical symptoms.

Figure A: Jaw biopsy with malignant cells
Figure B: CT abdomen showing thickening with stranding of sigmoid colon (blue arrow)
Figure C: Colonoscopy showing a 10cm fungating partially obstructing mass in the sigmoid colon.
Figure D: Sigmoid biopsy with invasive poorly differentiated adenocarcinoma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(19) Resolution of Acute Illness May Uncover Benign Ethnic Neutropenia

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Introduction: Benign ethnic neutropenia (BEN) with neutrophil count less than 1.5 K/uL, is seen in individuals of African, Jewish, West Indianian, Greeks and Arabic decent.

Case Presentation: 61-year-old African American male, with past medical history of COPD, OSA, CKD stage 3, morbid obesity, presented to the emergency department with progressive shortness of breath, productive cough, fatigue. He did not have fever, chills, chest pain, nausea, vomiting or diarrhea. The patient was in moderate respiratory distress, with increased work of breathing. His oral mucosa was dry. Chest examination showed decreased air entry with crackles and rhonchi bilaterally. There was pitting edema 2 plus bilaterally.Laboratory examination showed WBC 7.8 K/uL, hemoglobin 13.4 mg/dl, ANC 5.87 K/uL, lymphocyte 1.17 K/uL, creatinine 2.6 mg/dl, pro-BNP 1000 pg/ml, Arterial blood gas was significant for uncompensated respiratory acidosis with PH of 7.24, PCO2 80 mmHg, HCO3 24 mEq/L. Chest X-ray showed diffuse patchy infiltrate, with subsegmental atelectasis or consolidation. Patient started on nasal canula oxygen, DuoNeb, and BIPAP. His condition worsened, repeat PH was 7.18, he was transferred to ICU. He was intubated, placed on mechanical ventilation for acute hypoxic hypercapnic respiratory failure due to COPD exacerbation. Azithromycin, ceftriaxone and prednisone were initiated. On the second day, the patient's oxygen requirement improved, he was extubated and transferred to the step-down unit. Sputum and blood cultures showed no growth. During the hospital course, his ANC gradually decreased from 5.8 K/uL on admission to > 4.8 K/uL > 3.13 K/uL > 2.2 K/uL > 1.44 K/uL > 1.11 K/uL > 1.07 K/uL > 1.16 k/uL > 0.84 K/uL . Neutropenic contact precautions were started, infectious work up for hepatitis C and B, and HIV were negative. He used alcohol in moderation. He did not have any nutritional deficiency, rheumatologic or hematologic disorder. Patients' outside medical records were reviewed and showed longstanding neutropenia. ANC in Dec 2009 was 1.4 K/uL, Sep 2010 was 1.3 K/uL, March 2014 was 1.4 K/uL, Jan 2015 was 1.4 K/uL, Sep 2019 was 1.08 K/uL, Oct 2021 was 1.6 K/uL.

Clinical Impact: On admission patient's neutrophil count was normal, this due to relative increase from his baseline due to acute illness and prednisone (used for treatment of CPOD exacerbation). The decrease in ANC in the following 7 days is a consequence of improvement in the patient's medical condition and return to his baseline neutropenic status. The patient was not at an increased risk of infection and no further work-up was needed.

Discussion: BEN is not associated with increased risk for infections. Under physiological stress, the increase in ANC in BEN patients is slightly lower compared to normal individuals and might hide baseline mild neutropenic status. BEN should be differentiated from congenital neutropenia which confers an increase in lifelong risk of infection. The diagnosis of BEN is based on persistent ANC less than 1.5 K/uL in individuals from certain ethnic backgrounds, without history of recurrent infections and without an alternative explanation of neutropenia.

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*Post-Ablation Follow-Up for Supraventricular Tachycardia and Atrial Flutter: A Case Study

(NOT PRESENTING LIVE TODAY)

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Introduction: Supraventricular tachycardia (SVT) is a common arrhythmia characterized by rapid heart rates originating above the ventricles. It significantly impacts quality of life, particularly in younger populations. Radiofrequency ablation (RFA) is considered the gold standard for managing refractory cases, with success rates exceeding 95% in specific SVT subtypes (Katritsis et al., 2017). This case highlights the diagnostic approach, intervention, and post-procedure follow-up of a patient with recurrent SVT and atrial flutter.

Case Presentation: A 23-year-old female presented with a one-year history of episodic palpitations, dizziness, and syncope, prompting further evaluation.

- **History & Physical (H&P):** Intermittent rapid heart rate episodes, associated with syncope lasting approximately 10 seconds. No prior surgeries or allergies.
- **Diagnostics:**
    - **Electrocardiography (ECG):** Confirmed SVT and atrial flutter.
    - **Holter Monitoring:** Documented intermittent arrhythmias.
    - **Electrophysiology Study (EPS):** Identified a left posterolateral accessory pathway.

On October 21, 2024, the patient underwent RFA under general anesthesia. Using 3D electroanatomic mapping, the left posterolateral accessory pathway was successfully ablated.

Results: The patient experienced complete symptom resolution with no recurrence of arrhythmias during follow-up. Post-procedure ECG demonstrated normal sinus rhythm, confirming procedural success.

Discussion: SVT and atrial flutter arise from abnormal reentrant circuits or accessory pathways, necessitating precise diagnosis and management.

- **Diagnostic Approach:**
    - ECG remains essential for identifying arrhythmia type.
    - EPS serves as the gold standard for mapping accessory pathways and guiding ablation.
- **Treatment:**
    - RFA involved transseptal access to the left atrium, mapping the arrhythmogenic focus, and ablating the left posterolateral accessory pathway.
    - Success was confirmed by the absence of inducible arrhythmias post-procedure.

Clinical Implications

- Early recognition of refractory SVT facilitates timely intervention with RFA, which boasts high efficacy and low complication rates.
- Lifestyle modifications, including hydration, stress management, and avoiding triggers (e.g., caffeine), may reduce recurrence risk (Mayo Clinic, 2025).

Conclusion: This case demonstrates the effectiveness of RFA in achieving symptom resolution and improving the quality of life for patients with refractory SVT. Key takeaways include:

1. Prompt identification and management of refractory SVT improve patient outcomes.
2. RFA is a highly effective and low-risk intervention for arrhythmias.
3. Long-term follow-up is essential to assess recurrence and optimize patient care.

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*Neurotoxic Sequelae of a Recluse Spider Bite: A Rare Case of Transverse Myelitis

(NOT PRESENTING LIVE TODAY)

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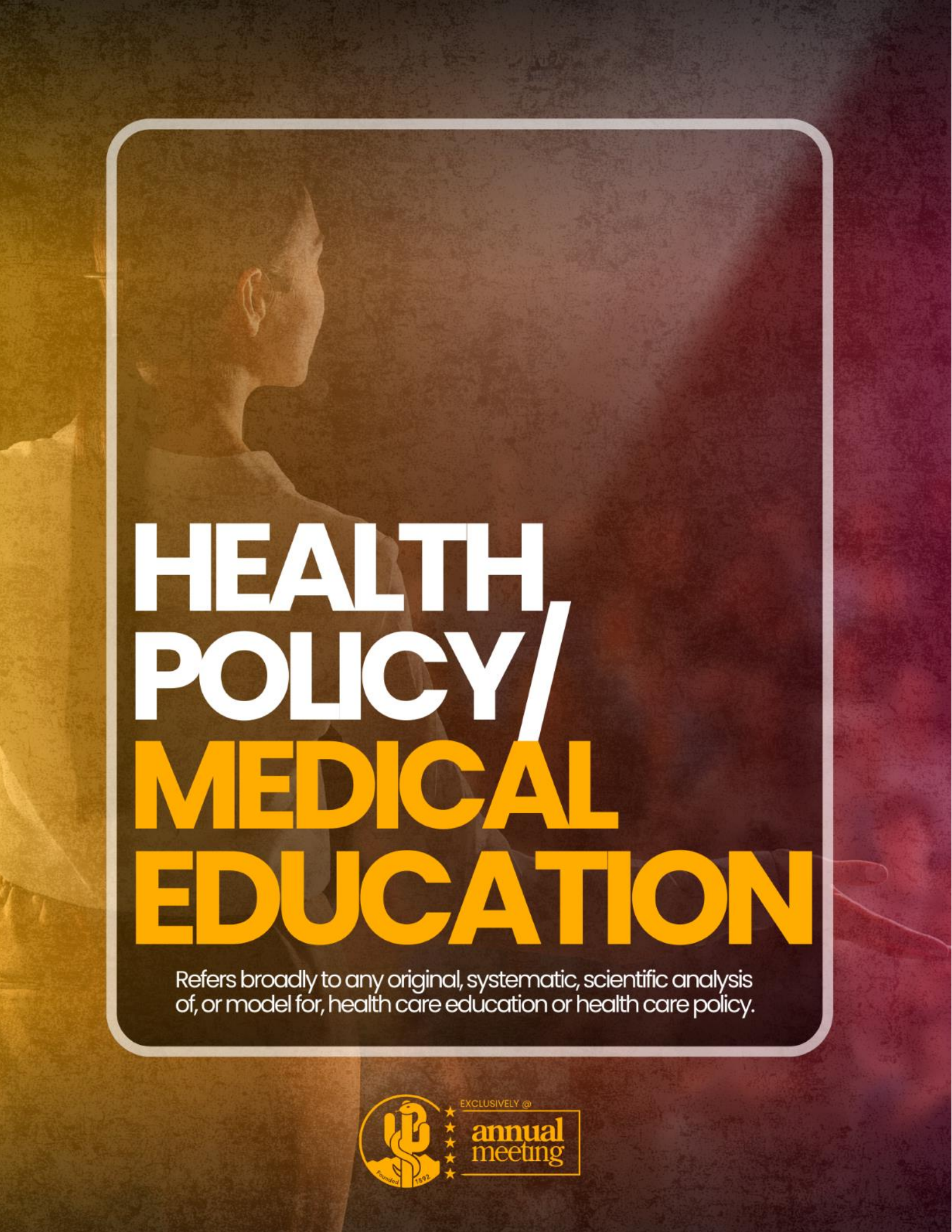
Introduction: Recluse spiders, known for their potent venom, can cause a condition termed Loxoscelism, marked by diverse clinical manifestations. In the southwestern United States, the Desert Recluse predominates, bearing toxicity comparable to the Brown Recluse. While the majority of bites lead to minor irritation, only 10–20% result in necrosis. Neurological complications are exceedingly rare, but cases have been documented. A 2022 report detailed facial nerve palsy following a Brown Recluse bite to the neck, while another described progressive lower extremity weakness after a bite to the inguinal region. These rare but notable cases underscore the potential for neurological effects from recluse spider bites, a risk that is often overlooked.

Case Presentation: In 2024, a 74-year-old male presented to a VA Emergency Department (ED) with dizziness, presyncope, malaise, and severe difficulty ambulating, despite consistent physical therapy. His symptoms traced back to a recluse spider bite sustained during a 2022 hiking trip. The bite, located on his spine, was suspected to facilitate venom entry into the CSF, triggering neuroinflammation and subsequent neurological decline.
Initially, he sought care in 2022 for acute leg weakness, fever, chills, neck stiffness, and malaise. Examination revealed bilateral lower extremity weakness, diminished reflexes, and a wide-based antalgic gait. Vital signs included a temperature of 101.2°F, HR 94, BP 159/78, RR 16, and SpO2 95% on room air. Lab results showed WBC 13.4, CRP 3.20, and lactic acid 3.7. Thoracic and lumbar MRIs were unremarkable, and lumbar puncture ruled out infectious meningitis but showed albuminocytologic dissociation. Despite treatment with intravenous fluids, steroids, and antibiotics, his deficits persisted, even as vitals and lab values stabilized. Electromyography (EMG) findings were normal, and Lyme disease, syphilis, and vasculitis tests were negative.
Over the following years, the patient experienced persistent neurological symptoms, including progressive gait instability, malaise, and recurrent ED visits for worsening ataxia and dizziness. These symptoms resulted in significant deconditioning, dependence on a walker, and reduced quality of life, underscoring the long-term consequences of the envenomation.

Clinical Impacts/Relevance: This case illustrates an unusual manifestation of recluse spider envenomation with severe neurological involvement. While most literature focuses on local necrosis or systemic loxoscelism, this case broadens our understanding of the neurotoxic potential of recluse spider venom. Persistent deficits despite aggressive therapy underscore the importance of multidisciplinary care and the need for further research into targeted treatments for venom-induced neurological conditions.

Discussion: Recluse spider envenomation rarely leads to severe neurological complications. This case demonstrates a scenario where venom infiltrated the CSF, causing neuroinflammation. CSF analysis revealed yellow discoloration and elevated protein levels, indicative of inflammation. Although Guillain-

Barré Syndrome was initially considered as a differential diagnosis, normal EMG findings and symptom progression favor idiopathic transverse myelitis. Despite treatment, the patient's deficits persisted, highlighting the complexity of managing venom-induced neuropathology.



HEALTH POLICY/ MEDICAL EDUCATION

Refers broadly to any original, systematic, scientific analysis of, or model for, health care education or health care policy.

EXCLUSIVELY @ annual meeting

(20) Current disparities in gender and medical degree among emergency medicine authors

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Objective: Previous investigations of the demographics of authors publishing research in emergency medicine (EM) have demonstrated a disparity in rates of publication, with male authors publishing more than female authors[1] and allopathic (MD) authors publishing more than osteopathic (DO) authors.[2,3] The objective of this research is to determine the current levels of disparity in gender (male versus female) or medical degree (MD versus DO) among first, second, and last or senior authors of original research publications in five high-impact emergency medicine (EM) journals, over five years (2019-23).

Methods: This was a retrospective study of original research in five high-impact EM journals (Academic EM, American Journal of EM [AMJEM], Annals of EM, Journal of EM [JEM], Western Journal of EM [WJEM]). All original research published in the five journals over five years (2019-23) was aggregated (n=2,384). (Note: research is ongoing, with approx. 94% of target data collected and summarized here). The gender, medical degree, and other academic degrees were tallied for all first, second, and last authors. Individuals for whom gender or academic credentials could not be verified were excluded from the statistical analysis. Statistical analysis was performed on comparisons of the number of MD versus DO authors (Table 1), including a comparison of the total number of MD and DO authors (Kruskal-Wallis test, $\alpha = 0.05$) as well as a comparison of the distribution amongst first, second, and last authors (Chi-squared test, $\alpha = 0.05$). The same comparisons were performed for male versus female authors (Table 2).

Results: 2,385 articles were aggregated with a total of 16,804 named authors, with 4,991 authors designated as first, second, or last and tabulated by gender and degree. Publishing authors in high-impact EM journals over the five years were disproportionately more MD (94-97%) than DO (2-6%, ratio MD:DO=11.5, $p<0.001$) and more male (59-72%) than female (27-41%, ratio M:F=1.4, $p<0.001$). The same disparities exist between first, second, and last authors, with the single largest difference in medical degree type among last authors (ratio MD:DO=34.5, $p<0.001$), meaning 97.3% of last authors were MD versus 2.7% that were DO.

Discussion: These results highlight the disparity in rates of EM publications, consistent with that of previous research. While research by male authors is published at disproportionately higher rates than research by female authors, these findings agree with that of other research, suggesting that the proportion of publications from female authors has increased steadily over time. The disparity between MD and DO authors, however, has remained more constant, with DO authors still comprising less than 7% of first, second, or last authors in high-impact EM research.

Conclusion: In original research published across five high-impact EM journals over five years (2019-23), there remains a disparity in rates of publication between MD and DO authors. Additionally, female physicians are under-represented when compared to their male counterparts; however, this disparity has decreased in recent years.

Table 1: Comparison of MD versus DO authorship and distribution as first, second, or last authors by year

	2019 (n=335)	2020 (n=447)	2021 (n=260)	2022 (n=388)	2023 (n=249)	p-value [1]
Total Number of DO Authors	83	104	56	91	66	0.345
Total Number of MD Authors	909	1,161	716	1,173	632	<0.001***
						p-value [2]
DO First Author	6.3% (21/334)	6.0% (26/435)	5.1% (13/256)	4.9% (21/426)	4.6% (11/237)	0.988
DO Second Author	6.1% (17/280)	4.4% (15/341)	3.0% (6/202)	4.1% (14/344)	6.0% (10/167)	0.580
DO Last Author	3.2% (11/344)	3.6% (16/442)	1.8% (5/282)	2.9% (13/451)	2.0% (5/254)	0.852
MD First Author	93.7% (313/334)	94.0% (409/435)	94.9% (243/256)	95.1% (405/426)	95.4% (226/237)	0.037*
MD Second Author	93.9% (263/280)	95.6% (326/341)	97.0% (196/202)	95.9% (330/344)	94.0% (157/167)	0.014*
MD Last Author	96.8% (333/344)	96.4% (426/442)	98.2% (277/282)	97.1% (438/451)	98.0% (249/254)	<0.001***

DO, Doctor of Osteopathic Medicine; MD, Doctor of Medicine
**p < 0.05; **p < 0.01; ***p < 0.001*
1. Kruskal-Wallis Test (α = 0.05)
2. Chi-squared Test (α = 0.05)

Table 2: Comparison of male versus female authors and distribution as first, second, or last authors by year

	2019 (n=335)	2020 (n=447)	2021 (n=260)	2022 (n=388)	2023 (n=249)	p-value [1]
Total Number of Male Authors	459	610	285	474	275	0.007**
Total Number of Female Authors	295	407	220	356	197	0.147
						p-value [2]
Male First Author	67.0% (319/476)	64.7% (410/634)	59.0% (187/317)	59.3% (303/511)	61.4% (181/295)	<0.001***
Male Second Author	61.9% (291/470)	63.4% (393/620)	55.0% (164/298)	55.8% (270/484)	62.9% (185/294)	<0.001***
Male Last Author	77.0% (359/466)	73.9% (459/621)	70.3% (215/306)	70.8% (364/514)	68.8% (203/295)	<0.001***
Female First Author	33.0% (157/476)	35.3% (224/634)	41.0% (130/317)	40.7% (208/511)	38.6% (114/295)	<0.001***
Female Second Author	38.1% (179/470)	36.6% (227/620)	45.0% (134/298)	44.2% (214/484)	37.1% (109/294)	<0.001***
Female Last Author	23.0% (107/466)	26.1% (162/621)	29.7% (91/306)	29.2% (150/514)	31.2% (92/295)	0.001**

**p < 0.05; **p < 0.01; ***p < 0.001*

1. Kruskal-Wallis Test (α = 0.05)

2. Chi-squared Test (α = 0.05)

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(21) Optimizing Medical Training: Insights from Online Resources on Tympanoplasty

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Background: In the rapidly evolving landscape of medical education, understanding patient concerns and interests is crucial for developing relevant and impactful curricula. Internet search analytics provides a powerful tool for gaining insights into patient inquiries and the quality of patient-facing information.

Objective/Hypothesis: This study focuses on tympanoplasty, a common surgical procedure, to demonstrate how internet search trends inform and enhance graduate medical education (GME). By analyzing patient search behaviors and evaluating the quality of online resources, we aim to provide medical educators and residents with real-time data that can be used to customize educational content, address patient needs, and identify gaps in available resources. This approach ensures that medical students and residents are better prepared to meet the demands of patient care and improve health outcomes. We hypothesized that patients most frequently would have questions regarding cost and post-operative experience.

Methods: Seven tympanoplasty-related search terms were selected: “tympanoplasty,” “ear drum repair,” “tympanic membrane surgery,” “ear surgery,” “tympanoplasty recovery,” “tympanoplasty complications,” and “tympanoplasty success rate.” Using a search engine optimization tool, we extracted the most frequently asked questions and corresponding websites from Google's People Also Ask tool. Questions were categorized into twelve subcategories specific to tympanoplasty using Rothwell’s classification system. Each website was assessed for quality using the QUEST criteria (0-27 scale) by two blinded reviewers. Single-factor ANOVA tested the association between QUEST scores by search term and website type.

Results: A total of 490 questions and their associated websites were analyzed. The most frequently asked question categories were technical details (15.2%) and postoperative experience (15.2%), followed by indications (10.4%) and complications (9.6%). The most common technical questions involved anesthesia, operation severity, and procedure length. Less frequently asked questions involved preoperative experience (4.3%) and cost (3.9%). No significant difference ($p > 0.1$) in QUEST scores was found among the seven search terms. Significant differences were observed among website types, with government sites having the highest QUEST scores (19.14 ± 6.21) but representing only 9.7% of websites. Medical practices, the most referenced website category (50.7%), had the lowest QUEST scores (11.5 ± 5.95).

Discussion: The analysis reveals a predominant patient interest in the technical details and postoperative experiences of tympanoplasty, indicating a deficiency in physician communication of surgical details. The lower quality of information found on medical practice websites, which are the

most frequently accessed, highlights a lack of physician awareness of patient needs. These findings underscore the importance of integrating internet search analytics into GME to ensure that future clinicians are better prepared to address patient concerns and provide accurate, high-quality information.

Conclusion: Internet search analytics can significantly enhance GME by identifying patient knowledge gaps and the quality of online information. By understanding common patient inquiries and the quality of available resources, medical educators can tailor their curricula to prevent deficiencies in physician-patient communication, thereby improving patient education and outcomes. Incorporating this real-time data into GME programs can foster a more informed and responsive approach to medical training.

(22) Enhancing Anatomy Education in Medical School: The Impact of Microlearning on Medical Education Satisfaction and Knowledge Retention

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Introduction: Microlearning modules have become an effective tool in medical education, simplifying complex material into digestible, focused chunks. While this method, once called "incremental learning," has existed for years, modern microlearning is tailored for digital platforms, making it more flexible and accessible. Effective microlearning modules are short, easily searchable, and designed to be completed independently in about 15 minutes [2,6] . This approach has been successful in medical programs, improving satisfaction and engagement among busy trainees [4] . Microlearning's advantages include affordability, accessibility, and speed, offering a cost-effective alternative to traditional lectures. However, it is less effective for complex or abstract concepts [5] . For anatomy, which can be broken down into smaller, clear objectives, microlearning is particularly well-suited. This study explores the use of asynchronous microlearning in otolaryngology (ENT) and neuroanatomy for first-year medical students, assessing both satisfaction and knowledge retention.

Methods: Eleven ENT and neuroanatomy modules were created for asynchronous learning through EdApp, a microlearning platform. Each module included short videos, bite-sized content, and practice questions, designed for completion in 5-10 minutes. Participation was voluntary, with 100 first-year medical students invited to use the modules based on their learning needs. After two weeks, all students were encouraged to complete a knowledge assessment and satisfaction survey. The survey evaluated content satisfaction and platform usability on a 0-10 scale, and participants were asked if they would use EdApp again. Assessment and satisfaction scores were compared and analyzed for statistical significance.

Results: Of the 101 first-year medical students invited to participate, 59 engaged with the anatomy microlearning modules on EdApp, with 47% of users completing the satisfaction survey. Among EdApp users, the average satisfaction scores for content and overall platform usability were 8.8 ± 1.4 and 8.6 ± 1.7 out of 10, respectively. Of this group, 96% of respondents indicated they would use EdApp for anatomy microlearning again. A total of 25 students completed the knowledge assessment. Within this group, EdApp users achieved an average score of 92%, compared to 87% among non-users, with a p-value of 0.25.

Discussion: This study assessed the effectiveness and user satisfaction of microlearning modules for anatomy education among first-year medical students using the EdApp platform. Results indicated high satisfaction with both content (8.8 ± 1.4) and platform usability (8.6 ± 1.7), with 96% of respondents willing to use EdApp again. Users of the microlearning modules scored slightly higher (92%) on a knowledge assessment than non-users (87%), though the difference was not statistically significant ($p = 0.25$) due to a small sample size and low participation rates. Despite these limitations, the positive feedback on content and usability suggests microlearning's potential to enhance student engagement and provide a flexible, on-the-go learning experience [1-5] . The study highlights microlearning as a

promising tool for anatomy education, but further research with larger sample sizes is needed to better understand its impact in medical education.

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(23) Differences in Peer-Reviewed Publications Between Successfully Matched Integrative Vascular Residency Applicants

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Background: The match is a universal program used by graduating medical students as well as post-graduation medical students to be placed into training programs to further their education in a particular specialty(1). Studies have attempted to define the qualities of medical students that have successfully matched into a program (4,5). Sites such as the NMRP give statistical data of the amount of publications, research experiences, but the data is not checked or confirmed as it is self-reported(2,3). There are limited studies on how many research experiences and publications were needed by successful applicants to obtain a position into a competitive integrated vascular surgery residency(6). In a field that is competitive we look to investigate the differences between applicants from top 20 NIH funded hospitals and those not in the top 20, and applicants that matched into university program to those who matched into an affiliate program.

Objective: To determine publication characteristics of successful applicants who matched into an integrated vascular surgery residency.

Methods: A retrospective cohort of all allopathic and osteopathic integrative vascular surgery residents who matriculated from 2019 through 2023 were included in analysis. All demographic data was collected for each program's website and when gender could not be determined the resident was removed from analysis. Publication data including the manuscript's topic (vascular or non-vascular), journal of publication (vascular or non- vascular) type of manuscript (article or review), and author position (first, second, or other) from six months prior to matriculation into residency was obtained from SCOPUS. Residency category (academic, affiliate, or community) was determined by the data provided by AAMC ERAS. Data are reported as a median with interquartile range and was analyzed using either a Mann-Whitney U or an uncorrected Kruskal-Wallis test. Due to the small number of residents who matched at a community program, the category was not analyzed when comparing publication characteristics at specific program categories.

Results: Over the time studied, a total of 356 integrated vascular surgery residents who published 742 manuscripts were included in final analysis. From 2019 through 2023 there was a non-significant large positive relationship between time and the number of manuscripts published ($r(3)=0.900$, $p=0.100$). No statistical differences in publications or authorship positions were noted between male and female or MD and DO integrated vascular surgery residents for any category studied. Residents who attended a medical school ranked in the top 20 for NIH funding had statistically more total publications ($p=0.006$), vascular publications ($p=0.071$), other topic publications ($p=0.009$), original research articles ($p=0.0017$), review articles ($p=0.006$), second author publications ($p=0.030$), and other position author publications ($p=0.016$). Those who successfully matched into a university-based residency has statistically more total publications ($p=0.041$), vascular surgery publications ($p=0.013$), and first author publications ($p=0.012$) as compare to those who matched into an affiliate based program.

Conclusion: Among successful integrated vascular residents those that attended a NIH top 20 funded medical school had more total publications and original research than those who did not. Applicants

that were successful in matching into a university based residency had more total publications than applicants that matched into affiliated program.

Tables

	Not Top 20 (n=301)	Top 20 (n=55)	p-value
Total Publications	0	1	0.006
Vascular Publications	0	0	0.071
Other Topic Publications	0	1	0.009
Author Position			
First Author	0	0	0.167
Second Author	0	0	0.030
Other Author	0	0	0.016
Type of Article			
Research	0	1	0.017
Review	0	0	0.006

	Affiliate Program (n=91)	University Program (n=260)	p-value
Total Publications	0	0	0.041
Vascular Publications	0	0	0.013
Other Topic Publications	0	0	0.217
Author Position			
First Author	0	0	0.012
Second Author	0	0	0.470
Other Author	0	0	0.020

Type of Article			
Research	0	0	0.072
Review	0	0	0.105

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(24) Substance Use Disorder, Depression, and Healthcare Utilization among Homeless Young Adults: A SDOH Perspective

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Introduction: Homelessness continues to rise significantly in the US, with counts in 2023 representing an all-time high. Persons experiencing homelessness have an increased prevalence of adverse social determinants of health (SDOH) -- the factors in an individual's lived environment that impact their ability to achieve optimal health and wellbeing. Of those experiencing homelessness, the young adult demographic is disproportionately affected by negative health outcomes. Additionally, mental illness prevalence in this population, including substance use disorder (SUD) and depression, further complicate healthcare needs. This study aims to deduce SDOH protective and risk factors impacting young adults experiencing homelessness with diagnosed SUD and depression in urban underserved Phoenix.

Methods: This study analyzed survey data from the SDOH among Homeless Young Adults pilot project in the Phoenix metropolitan area. Data was collected from individuals aged 18-34 without a fixed, regular, and adequate nighttime residence, while utilizing services from various community partners, heat relief sites, and in surrounding encampments June-August 2022. Descriptive statistics and logistic regression models were used to evaluate the relationship between SUD and depression and various SDOH factors.

Results: 205 responses are included in this dataset. Among the respondents, 55.26% reported having a SUD, 59.69% reported diagnosed depression, and 37.07% reported comorbid SUD and depression. Regarding SUD, every one-year increase in age (OR = 1.140, p = 0.020) and one-unit increase in Adverse Childhood Experiences (ACEs) score (OR = 1.271, p = 0.006) increased the odds of a SUD diagnosis. Reporting supportive family and friends was also associated with a positive diagnosis (OR = 2.764, p = 0.049). Significant protective factors included identifying as Black (OR = 0.111, p = 0.005) and having internet access (OR= 0.301, p = 0.033). For depression, Latinx, Native American, and mixed/other races, and those that report good support services had significantly higher odds of being diagnosed with depression. Those who identified as female (OR = 0.202, p = 0.014) and heterosexual (OR = 0.077, p = 0.005) had lower odds of having depression, as did those with part-time employment (OR = 0.017, p = 0.003) and internet access (OR = 0.072, $p < 0.001$).Risk factors for experiencing both SUD and depression included never being married (OR = 15.354, p = 0.001) and a higher ACEs score (OR = 1.225, p = 0.034). Females (OR = 0.222, p = 0.015) and those with internet access (OR = 0.075, $p < 0.001$) had lower odds of having the dual diagnosis.

Discussion: This study elucidates SDOH factors of young adults experiencing homelessness with SUD and/or depression in the greater Phoenix area. The factors that pose the highest risk for SUD include increased age and ACEs score. Additionally, many racial and sexual orientation minority groups are at higher risk of a depression diagnosis. Comorbid SUD and depression were associated with those never married and with a higher ACEs score. Across all three groups studied, internet access was a consistent protective factor. Healthcare professionals should screen for these factors as part of clinical evaluation and treatment planning.

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(25) The Effect of Social Determinants of Health and the COVID-19 Pandemic on Epidural Anesthesia during Vaginal Labor/Deliveries

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Importance: Social determinants of health (SDOH) are key drivers of healthcare disparities in pain management.

Objective: This study evaluates whether SDOH-related disparities in epidural use persist with contemporary data and assesses the impact of the COVID-19 pandemic.

Design: This retrospective study examined vaginal delivery records from 9-month periods pre-pandemic (June 1, 2019, to February 2020) and during the pandemic (April 1 to December 31, 2020).

Setting: The study was conducted at Banner University Medical Center-Phoenix, a major academic medical center in Arizona.

Participants: The study evaluated the utilization of epidural analgesia during vaginal deliveries among adult women (18 years and older) from all races and ethnicities, excluding those who had Cesarean sections. A total of 2,451 vaginal deliveries were included, with key sociodemographic features assessed, such as age, parity (number of previous births), gestational age, race, ethnicity, preferred language, and insurance status as a socioeconomic proxy.

Main Outcome(s) and Measure(s): The primary outcome was the utilization of epidural analgesia during vaginal deliveries, aiming to assess the rates and patterns of epidural use among the eligible patient population. Additionally, the study aimed to evaluate factors that influenced the use of epidural analgesia, including sociodemographic characteristics, clinical factors, and the COVID-19 pandemic.

Results: Of the 2451 participants, 1,531 (62.5%) received epidurals, with a significant increase during the pandemic (RR = 1.10, 95% CI: 1.04–1.17, p = 0.001). Younger women (< 20 years old) had the highest usage rate of epidurals (84.4%) overall. The median parity was significantly lower among those receiving epidurals (2 [IQR: 1-3]) compared to those who did not (3 [IQR: 2-4]; p < 0.001). No significant differences were found in other demographic factors like gestational age, race, ethnicity, language, and type of insurance, indicating progress toward equitable access.

Conclusions and Relevance: The COVID-19 pandemic significantly increased epidural use, with no observed disparities across most demographic factors. This suggests progress in equitable pain management, emphasizing the need for ongoing monitoring of SDOH-related factors to ensure access to adequate pain relief during labor/delivery and beyond.

(26) Impacts of Medical Clinic or Educational Event Participation on Medical Student Perception of Underserved Populations

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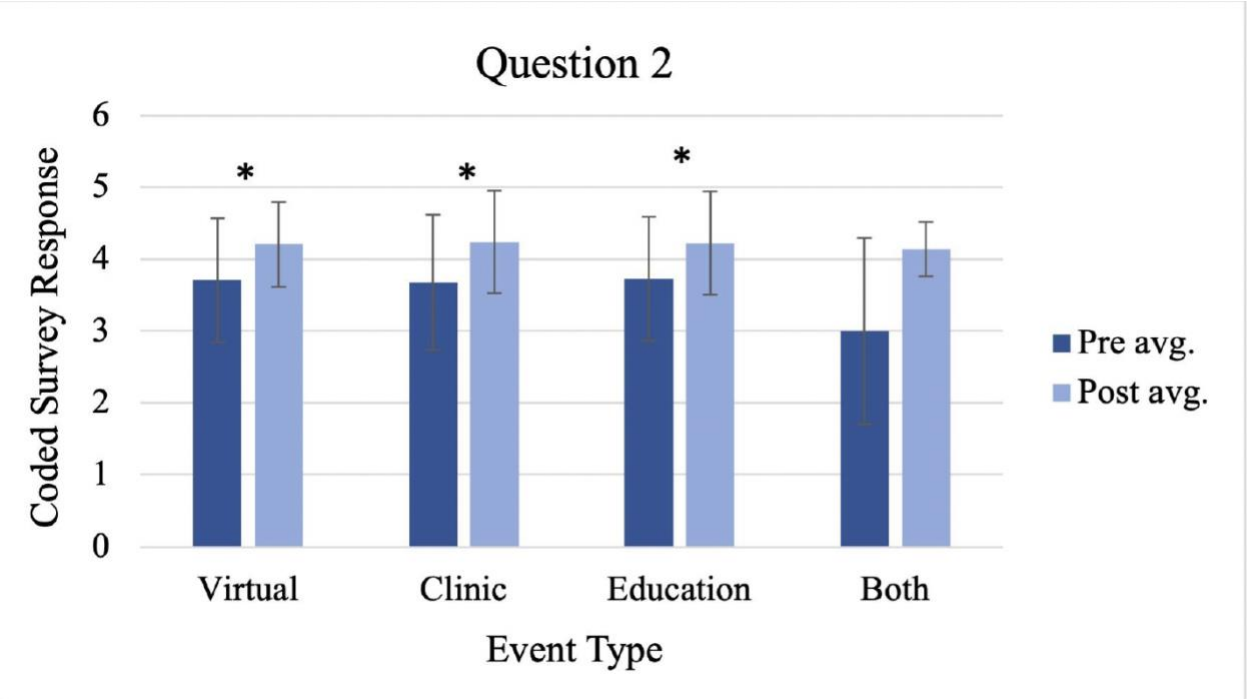
Introduction: There is a strong need for medical schools to incorporate social accountability into the curriculum. The Arizona College of Osteopathic Medicine (AZCOM) has risen to this call through student involvement in Health Outreach through Medicine and Education (HOME). HOME is a student-run organization that provides free healthcare and health education events for underserved clients residing in local shelters. All second-year AZCOM students take the HOME course, in which they are required to either participate in a student-run free medical clinic or develop and lead an educational presentation. A study on a similar student-run free clinic and course at the University of California San Diego School of Medicine found that medical students enrolled in this program reported increased understanding, skills, attitude and interest in working with underserved populations following their participation.1 This project intends to determine if a similar effect is observed in AZCOM students involved in HOME course through their participation in a clinic or education event.

Methods: The data for this project consists of pre/post HOME course survey responses by second year AZCOM students from 2020-2024. Questions 2 and 5 were selected to assess participants' attitude toward and knowledge of caring for underserved populations, respectively. The multiple-choice survey responses were extracted from Canvas and de-identified by the course coordinator, converted to a Likert scale by the author, and a statistical analysis was run using the SAS program.

Results: 306 participants completed an education event and 332 attended a clinic event (166 in-person, 166 virtually). The mean difference in pre and post-event response significantly increased for Question 2: 0.4967 (p-value <0.0001) in the education group, 0.5602 (p-value <0.0001) in the clinic group, and 0.5060 (p-value <0.0001) in the virtual clinic group. A significantly positive response to Question 2 was found in all three groups with t-test p values of 2.00x10-21, 1.23x-1, and 1.068x10-12 for the Education, Clinic and Virtual Clinic groups respectively. For Question 5, there was no significant mean difference nor difference in pre and post-survey responses for all three groups. Cohen's d was calculated for each event type to measure effect size when comparing the pre and post-event survey response means in Questions 2 and 5. In all groups for Question 2, Cohen's d values were greater than 0.5 representing a medium effect size (Virtual=0.68, Clinic =0.67, Education=0.63, Both=1.20). However, Cohen's d was less than a small effect size in all groups for Question 5.

Conclusion: This study found that involvement in the HOME course and a clinic or education event improved student attitude towards underserved populations, but did not significantly increase student knowledge in caring for these patients. The findings support continuation of the HOME program and offer insight to how the experience can be better tailored to improve student skills in this area.

Figure One: Pre and Post-event survey response averages for all groups on Question 2.



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(27) Orthopedic Surgeon Electronic Health Record Usage: Differences by Gender and Practice Years

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Introduction: Despite the electronic health record (EHR) revolutionizing clinical care since in the last 25 years, there is a growing body of research connecting EHR workload with physician burnout across specialties. Within orthopedic surgery, burnout rates are on the rise, and existing studies show trainees and female orthopedists report higher rates of burnout. Orthopedic surgeons at all levels of training have cited workload and technology as leading contributors to burnout. It remains unclear which aspects of the EHR may be most closely associated with burnout amongst orthopedic surgeons or if EHR demand is correlated with specific surgeon characteristics. This study identified differences in EHR burden and usage pattern by gender and practice years amongst attending orthopedic surgeons at a large, multi-site institution.

Methods: EHR activity log data was analyzed for 105 attending orthopedic surgeons at a single multi-site academic center from May 2022-May 2023. Demographic information was collected including self-reported sex, practice years, and clinical full-time equivalent (FTE). Outcomes included time spent in the system per day; time spent in notes, orders, clinical review, and in basket per day; time spent outside of scheduled clinical responsibilities; volume of in basket messages received per day, and proportion of orders with team contributions. Multivariable linear regression was performed to compare outcomes by gender and practice years, while controlling for physician characteristics, clinic workload, and practice volume.

Results: Practice years differed between male and female surgeons, with females practicing 8.56 years compared to males practicing 16.12 years (p=0.035). There was no difference in total FTE between male and female surgeons (p=0.737). Female orthopedic surgeons spent 31% more time in the EHR per day compared with their male counterparts (p=0.050), though there was no difference in time spent in notes, orders, or clinical review per day. Female surgeons received 90% more in basket messages compared with male surgeons (p=0.030), mainly attributed to patient calls (p=0.002). However, there was no significant difference in overall time spent in the in basket per day between male and female surgeons (p=0.07). Female surgeons logged 53% more time in the EHR on days they were not scheduled for clinical care (p=0.019). For every additional decade of practice, orthopedic surgeons spent significantly less time in the EHR system per day (p=0.019), in notes (p=0.022), and orders (p=0.048). More experienced surgeons also spent less time in the EHR on unscheduled days (p=0.013).

Discussion: Female orthopedic surgeons are spending more time in the EHR, receiving a higher volume of in basket messages from patients, and logging more hours on unscheduled days as compared with their male orthopedic colleagues. However, this increased EHR time is not due to documentation inefficiencies. Additionally, increased practice years are associated with decreased time spent in the EHR on notes and orders, increased support from other team members with placing orders, and decreased time spent in the EHR outside of clinical hours. With a growing body of evidence connecting EHR usage

to burnout, more investigation into the association between specific EHR components and orthopedic surgeon burnout is warranted.

Figure 1: Regression-Adjusted Outcomes by Gender

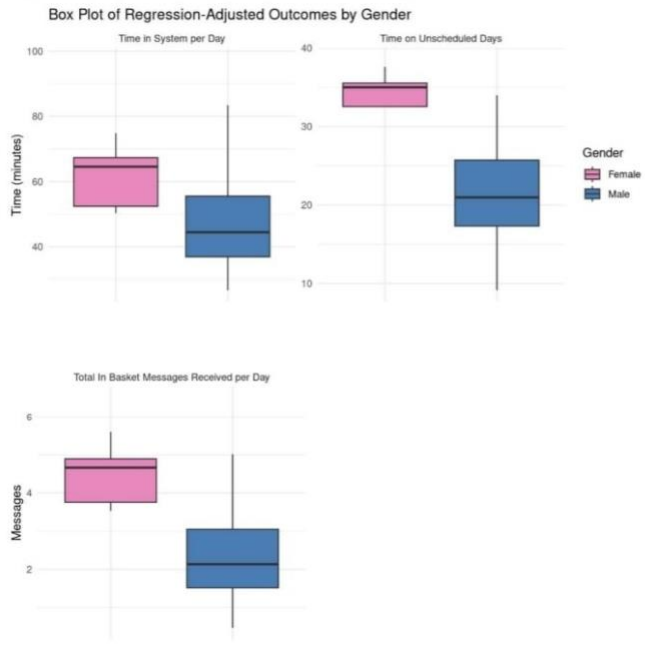
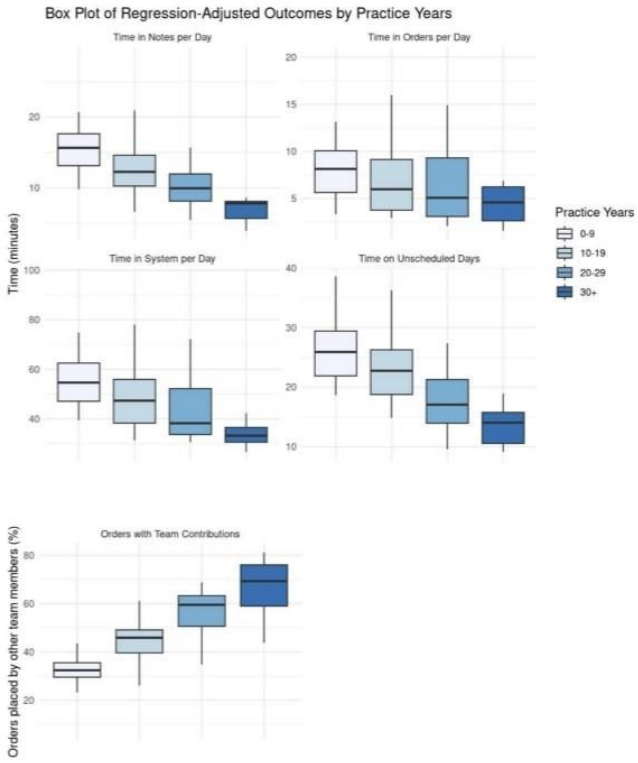


Figure 2: Regression-Adjusted Outcomes by Practice Years



(28) Exploring Trends in the Dermatology Residency Match Following the Single Accreditation Merger

Authors: Jeon H, Rizzo D, Skemp E, Dumke M, Clancy K, Falk L and Ashurst J
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Background: Prior to 2015, Doctors of Osteopathic Medicine (DOs) obtained residency positions through the American osteopathic Association (AOA) residency match. In 2020, a merge occurred that allowed both allopathic (MD) and DO students to apply for Accreditation Council for Graduate Medical Education (ACGME) -accredited programs through a Single Accreditation System (SAS). Despite the aim of creating equal opportunities, disparities persist, particularly in competitive specialties like dermatology. Between 2017 and 2019, 24.7% of previously AOA positions in dermatology were filled by MDs, while only 0.4% of ACGME positions went to DOs. Although there was an increase in DO applicants in 2023, the Match results indicated a decline in successful matches for DOs in dermatology. Osteopathic medical students now represent over 25% of U.S. medical students, however, the anticipated increase in DO representation in dermatology has not occurred.

Objective: This study aims to evaluate the effectiveness of the SAS in creating equal opportunities for MD and DO students and to assess the early impact of transitioning to ACGME accreditation on DO representation in dermatology residency programs.

Methods: The Midwestern University Glendale Institutional Review Board determined this project to be exempt from review. Published data from the National Resident Matching Program (NRMP) was used to analyze the 2018, 2020, and 2022 Charting Outcomes in the Match reports, along with the 2023 Main Match Results and Data Book. This evaluation focused on position offerings, the percentage filled by MDs versus DOs, and applicant statistics, including research and volunteer experience, as well as USMLE and COMLEX board scores. Data were assessed using descriptive statistics.

Results: Our data reflected applicants, positions offered and filled, board exam scores (USMLE Step 1/2, COMLEX Level 1/2), and average volunteer, research, and publication experiences for all allopathic and osteopathic fourth-year medical students accepted into ACGME dermatology residencies from 2018 to 2023. Although there was an increase in the number of DO applicants for dermatology residency from 2018-2022, the gap between the MD number of applicants and DO number of applicants showed an overall growth. Despite DO students comprising 25% of all medical students, MD students had over 7.5 times as many applicants as DO students and filled significantly more residency positions.

Conclusion The single accreditation merger has increased osteopathic representation in dermatology and expanded graduate dermatology education while intensifying competition between DO and MD applicants. Although average board examination scores of accepted candidates remain stable, raw score data alone may not accurately reflect competitiveness. While recent gains in DO match rates are encouraging, addressing disparities in research access within medical schools is crucial for ensuring equal opportunities for both DO and MD residency applicants in dermatology.

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(29) Publication characteristics of successful female and male dermatology applicants from 2020 through 2022

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Background: Dermatology remains one of the most competitive specialties to match into, as 939 applicants competed for 517 dermatology residency positions during the 2024 Match.[1] Research has proven to be a critical factor in the success of applicants applying to competitive specialties. The MD applicants who successfully matched into dermatology in 2024 had an average of 6.4 research experiences and 27.7 abstracts, presentations, and publications,[2] while DO applicants who matched into dermatology had an average of 4.5 research experiences and 15.4 abstracts, presentations, and publications.[3] Because this information does not distinguish between abstracts, presentations, and publications, it can be challenging for applicants to understand how their research credentials compare to those who successfully matched.

Methods: A retrospective cohort of all female and male dermatology residents who matriculated from 2020 through 2022 were included in analysis. All demographic data was collected from each program's website and when gender could not be determined the resident was removed from analysis. Publication data including the manuscript's topic (dermatology or non-dermatology), type of manuscript (article or review), and author position (first, second, or other) from six months prior to matriculation into residency was obtained from SCOPUS. Data are reported as a median with interquartile range and was analyzed using either a Mann-Whitney U or an uncorrected Kruskal-Wallis test. All correlations were calculated using the Spearman's correlation.

Results: In total, 1,3905 trainees (489 male and 906 female) and 2766 articles were included in final analysis. There was no difference in the number of total publications (1 [0-3] vs 1 [0-3]; p=0.236), dermatology publications (0 [0-1] vs 0 [0-1]; p=0.990), research articles (1 [0-2] vs 1 [0-2]; p=0.279), and review articles (0 [0-0] vs 0 [0-0]; p=0.884) between male and female trainees. However, there was a difference in those published articles that were considered to be on a "other" topic with males having a higher number of publications (0 [0-1] vs 0 [0-1]; p=0.018). Males were more likely to be in the "other" author position as compared to females (0 [0-1] vs 0 [0-1]; p=0.015) but there was no difference when the first (0 [0-1] vs 0 [0-1]; p=0.910) and second author (0 [0-1] vs 0 [0-1]; p=0.592) were considered. When comparing each individual year studied, no difference in any publication category was noted between male and female dermatology residents (Table 2). During the time period studied, however, a small positive trend was noted for female total publications (R=0.079, p=0.017), research publications (R=0.073, p=0.028), serving as the first (R=0.068, p=0.041), and second author (R=0.080, p=0.016) on manuscripts. A moderate positive trend was also noted for increased male dermatology publications (R=0.103; p=0.023) between 2020 and 2022.

Discussion: Little differences in publication patterns between male and female successful dermatology applicants were noted during the time period studied. Unlike their male counterparts, females are publishing at an increased rate over the three years studied but not specifically on dermatology topics. Males, however, have shown an increase in the number of publications in dermatology over the same time period.

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(30) The Endocarditis Escape Room: An Interactive Approach to Medical Learning

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Introduction: Escape rooms are growing in popularity in undergraduate medical education settings as a method for promoting critical thinking, teamwork, and improving active learning in adult students [1-2]. We will demonstrate our process in constructing an innovative environment by presenting a version of our newly developed simulation experience, designed to challenge participants with the complexities of infective endocarditis. Students have limited exposure to the clinical environment during preclinical years of undergraduate medical education. To combat this, we propose implementing clinical escape rooms with simulation technology to provide students with exposure to clinical scenarios to improve their skill acquisition and reinforcement of learned materials [3] while promoting teamwork, communication skills, and critical thinking in a timed environment [4]. Here we propose an educational summary report of a developed escape room on infective endocarditis that is ready to implement by undergraduate medical educators.

Methods: Our escape room consists of three sequential cases which serve as checkpoints, providing participants with the satisfaction of solving individual cases while also enabling the escape room developers to assign targeted learning objectives to each case. Case 1 will initiate the escape room experience, introducing participants to an acute drug overdose scenario where participants will need to assess vitals, diagnose an opioid drug overdose, and administer the appropriate treatment. Progression to Case 2 encompasses the evaluation and management of both meningitis and sepsis. This case integrates diagnostic and clinical skills, including applying SIRS criteria, interpreting lab studies, performing a lumbar puncture, and reinforcing pharmacology and microbiology concepts. Case 3 focuses on sequelae of infective endocarditis such as neuro-embolic events. Participants will interpret a CT angiogram, practice localizing vascular lesions from neurological symptoms, recognize physical exam findings characteristic to infective endocarditis, and identify valvular vegetations on an echocardiogram. Educational goals are met using various mediums such as word puzzles, riddles, hidden clues, invisible ink codes, and cipher decryptions. Setting the escape room in simulation labs ensures access to advanced medical technologies, including lifelike mannequins that replicate realistic patient scenarios.

Determining Results: Primary endpoints will assess the efficacy of teaching, changes of attitude and openness to learning, satisfaction with the simulation, and perceived effectiveness of the escape room model in education. Efficacy as a teaching model will be evaluated with a series of pre-post and four-week post activity evaluation of educational materials. Surveys such as the Learning Attitude Scale and Student Satisfaction and Self-Confidence in Learning Scale will be administered prior to and following the activity to meet investigational objectives.

Discussion: Implementation of the proposed escape room model offers an immersive and engaging approach to medical education where participants will reinforce their medical knowledge, build confidence in their clinical acumen, and hone their teamwork abilities. We hope that our model serves as a contribution to the growing understanding of gamification in undergraduate medicine and empowers educators with the tools necessary to run the model themselves.

Keywords: Medical Education, Escape Room, Drug Overdose, Infective Endocarditis, Meningitis, Sepsis, Neuro-Embolism, Simulation, Clinical Skills, Clinical Decision-Making, Teamwork.

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(31) The Impact of Civil War on Cardiovascular Disease Outcomes: A Global 21-Year Analysis

Authors: George Bcharah, Mena Abdullah, Nadia Islam, Johnathan Sayegh, Hussein Abdul Nabi, Ramzi Ibrahim, Mahmoud Abdelnabi

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Introduction: Civil wars have profound and long-lasting effects on societies, influencing economic stability, infrastructure, and public health. While direct casualties from conflict are well-documented, the long-term consequences on non-communicable diseases (NCDs), particularly cardiovascular disease (CVD), remain largely understudied. Chronic stress, displacement, disruptions to healthcare, and changes in lifestyle contribute to an increased risk of CVD mortality, disability-adjusted life years (DALYs), and prevalence. Given that CVD is the leading cause of death worldwide, understanding its relationship with armed conflict is critical. A broader comparative analysis across multiple conflict-affected regions provides a more comprehensive understanding of the global trends in CVD risk. This study aims to examine CVD burdens in countries affected by civil war from 2000 to 2021, analyzing trends across the Middle East, South Asia, and Africa.

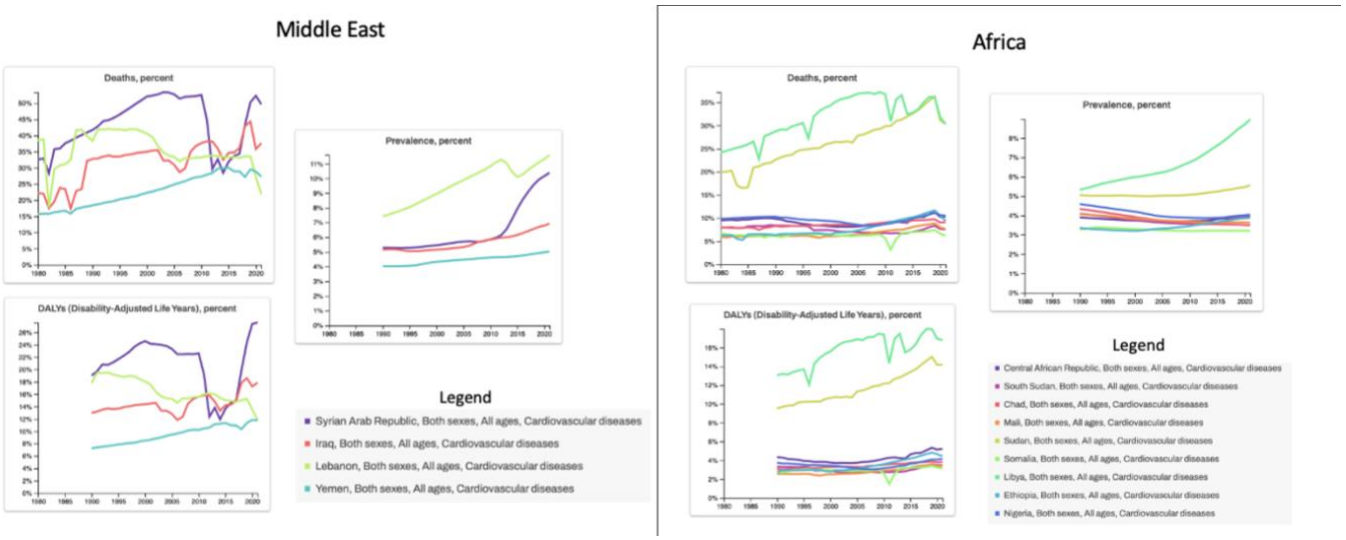
Methods: Data were extracted from the Global Health Data Exchange (GHDx) and the Global Burden of Disease (GBD) 2021 study, focusing on CVD mortality rates, DALYs, and prevalence estimates. Countries experiencing civil war in the 21st century were identified using the Global Health Tracker from the Center for Preventive Action. The study included 17 conflict-affected countries across the Middle East, South Asia, and Africa, analyzing data for all ages and both sexes. CVD mortality was assessed using cause-specific mortality rate (CSMR) analysis, while DALYs were calculated as the sum of years of life lost (YLLs) and years lived with disability (YLDs). Prevalence was estimated using Bayesian meta-regression (DisMod-MR 2.1).

Results: The findings reveal a strong correlation between prolonged conflict and increased CVD burden. In the Middle East, Syria and Lebanon experienced significant increases in CVD mortality and DALYs after 2010, aligning with periods of intensified conflict. Yemen showed a sharp rise in CVD prevalence, likely due to healthcare system collapse and food insecurity. In South Asia, Myanmar and Afghanistan demonstrated steady increases in CVD mortality and DALYs, with Afghanistan showing a decline in prevalence, potentially due to high war-related mortality masking chronic disease progression. In Africa, countries such as Sudan, Chad, and Nigeria exhibited rising CVD prevalence and DALYs, reflecting prolonged instability, healthcare inaccessibility, and deteriorating lifestyle factors such as poor nutrition, increased tobacco use, and reduced physical activity.

Discussion: These findings highlight the significant impact of civil wars on cardiovascular health, emphasizing the role of healthcare system strain, deteriorating lifestyle factors, and chronic stress. Prolonged conflict leads to reduced access to preventive care, overburdened hospitals, physician shortages, and a shift away from primary healthcare services. Additionally, displacement-related health disparities exacerbate the burden of CVD among refugee populations, who experience higher rates of untreated hypertension, diabetes, and heart disease. The study underscores the urgent need for targeted interventions in conflict zones, including strengthening healthcare infrastructure, prioritizing

CVD prevention, and integrating mental health services. Policymakers must consider the long-term cardiovascular implications of war when developing post-conflict recovery programs and global health strategies. Addressing these factors is essential for mitigating the long-term public health consequences of armed conflict and improving health outcomes in affected populations.

Figure 1. Deaths, Prevalence, and Daily-Adjusted Life Years (in %) Across Middle Eastern and African Countries Who Underwent Civil War.



(32) Innovations in Health Equity: A Multisite, Nationwide Hospital System's Strategic Approach to Achieving The Joint Commission's National Patient Safety Goal 16

Authors: Elika Javaheri; Alyssa Chapital, MD, PhD; Vaughn Bartch; Connie Cordle; Adam Milam, MD, PhD.
Affiliations: Mayo Clinic Alix School of Medicine, Mayo Clinic Department of Critical Care Medicine, Mayo Clinic Office of Healthcare Equity and Inclusion, Mayo Clinic Department of Anesthesiology and Perioperative Medicine.

Introduction: Achieving health equity is a critical priority in the United States. Regulatory requirements such as The Joint Commission's (TJC) National Patient Safety Goal 16 (NPSG 16) have delineated specific standards to advance health equity. This abstract highlights the innovative strategies implemented by Mayo Clinic, a multisite healthcare system, to create a robust model for health equity leadership and satisfy NPSG 16.

Methods: Mayo Clinic established four enterprise-wide health equity councils, each focusing on a distinct domain: education, clinical practice, research, or workforce equity. This structure acknowledges that to achieve clinical health equity, we must improve diversity in research, education, and our workforce [1-3]. Each council employs a dyad leadership structure, pairing a physician with an administrative leader; this ensures decisions are both patient-centered and operationally feasible. The composition of OHEI, our council on clinical health equity, demonstrates the multidisciplinary nature of our health equity groups; of 95 OHEI members, 12 are nurses, 11 are physicians, 10 are social workers, and others have backgrounds in diverse fields such as research and business. Beyond building multidisciplinary leadership structures, other key initiatives included the redesign of our Social Determinants of Health (SDoH) questionnaire in May 2023, reducing the questionnaire from 58 questions per year to 13 questions. This redesign increased response rates by over 30% across all major campuses. Additionally, to address a major barrier in referring patients to community resources – lack of clinician time – findhelp.org, a comprehensive repository of community resources, was integrated into our electronic medical record [4]. This allowed clinicians to refer patients with SDoH needs to community resources with only one click in a time-efficient process. Another digital tool, Compass Rose, was introduced to gauge individual patient interest in community resources, enabling intelligent resource allocation. Additionally, we utilized the Vizient Vulnerability Index to identify resource availability by zip code, which provided invaluable information for our large, multisite hospital system with patients hailing from many zip codes.

Results: This health equity model enabled Mayo Clinic to serve its patients better, create a culture of action, and achieve continued accreditation by TJC. Mayo Clinic has been successful with sixteen TJC site visits since NPSG 16 went into effect.

Discussion: Several key factors contributed to the success of this health equity model. Firstly, the involvement of physicians within our health equity councils proved to be critical. Research consistently highlights that physician participation in health equity efforts enhances outcomes, since physicians are deeply familiar with the needs of their patients [5]. Secondly, our drive to shorten our SDoH questionnaire resulted in a notable increase in survey response rates, enabling us to learn more about the needs of our patients [6]. However, there remain areas for improvement; our rural clinics lag behind

in SDoH questionnaire response rates. All in all, by employing a dyad leadership model, integrating digital tools, and examining processes for SDoH data collection, other hospital systems can replicate Mayo Clinic's model for meeting and exceeding NPSG 16 standards.

Figure 1:

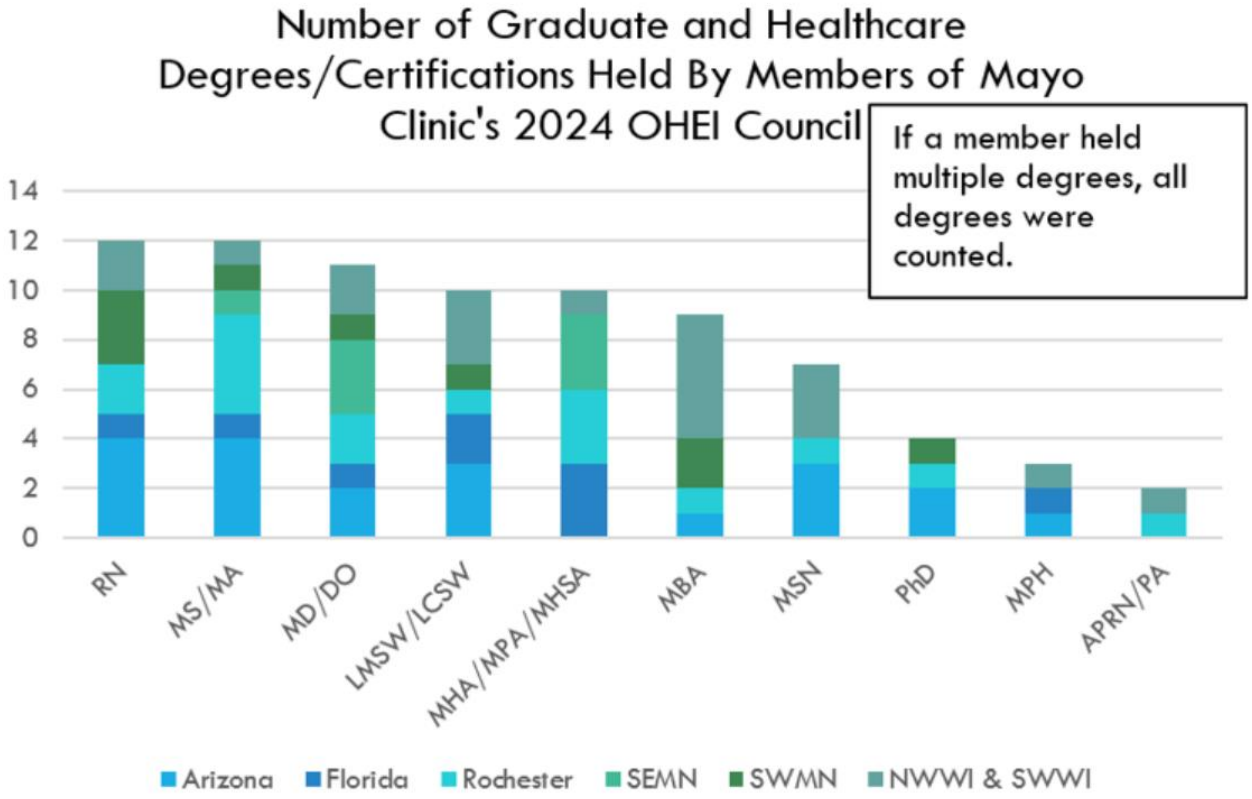


Figure 1. Number of degrees and/or certifications held by members of Mayo Clinic's 2024 Office of Healthcare Equity and Inclusion (OHEI) council. If a member held multiple degrees, all degrees were counted. RN = Registered Nurse, MS = Master of Science, MA = Master of Arts, MD = Doctor of Medicine, DO = Doctor of Osteopathic Medicine, LMSW = Licensed Master Social Worker, LCSW = Licensed Clinical Social Worker, MHA = Master of Health Administration, MPA = Master of Public Administration, MHSA = Master of Health Services Administration, MBA = Master of Business Administration, MSN = Master of Science in Nursing, PhD = Doctor of Philosophy, MPH = Master of Public Health, APRN = Advanced Practice Registered Nurse, PA = Physician Assistant. SEMN = Southeast Minnesota, SWMN = Southwest Minnesota, NWWI = Northwest Wisconsin, SWWI = Southwest Wisconsin.

Figure 2:

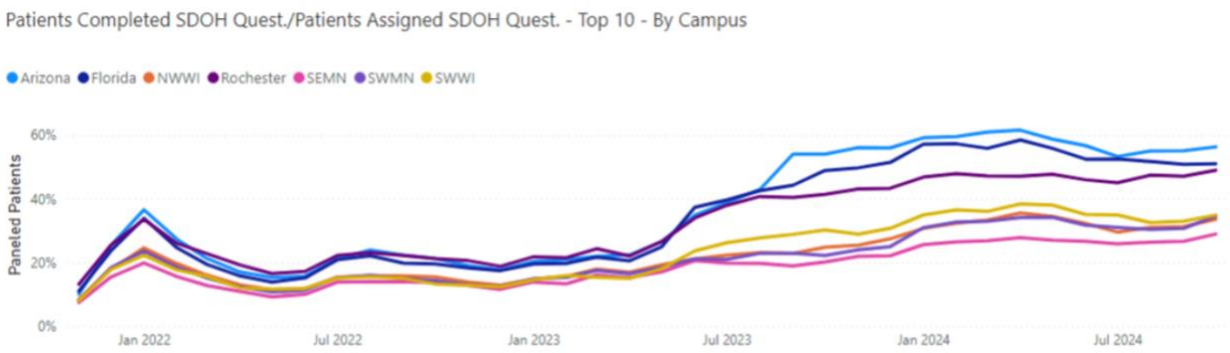


Figure 2: Trends in Social Determinants of Health (SDoH) questionnaire (Quest.) completion rate by Mayo Clinic campus from January 2022 to July 2024. Demonstrates an increase in questionnaire completion rate after implementation of shortened questionnaire in May 2023. NWWI = Northwest Wisconsin, SEMN = Southeast Minnesota, SWMN = Southwest Minnesota, SWWI = Southwest Wisconsin.

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(33) Medical School Pipeline Programs as Influential Consideration in Career Choice

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Background/Objective: Saturday Scrubs and Summer Scrubs are two of the pipeline programs that were started at the University of Arizona College of Medicine-Phoenix in the 2014-2015 academic year. The programs were designed to allow high school students from across the state to explore their interests in the medical field. We sought to evaluate the student's perspective of how participation in the pipeline programs influenced their career or educational decisions.

Methods: Students and parents of students who participated in either Saturday Scrubs or Summer Scrubs between 2015 and 2019 were emailed a link to an anonymous survey that was designed to assess the impact of the program on their decision to pursue or not to pursue a career in medicine. Of the 2288 emails sent, 2173 were delivered and 115 were returned as undeliverable. The survey was available for a three week period between March and April of 2024 with one reminder email sent two weeks after the initial email was sent. Survey responses included demographic data and Likert scale questionnaires for respondents to complete.

Results: There were a total of 292 survey respondents. After incomplete responses were filtered out, there were 214 complete survey responses. In regards to race, the percent breakdown is as follows: 46% White, 5% Black/African American, 28% Asian, 4% American Indian/Alaska Native, 11% Other, 6% Prefer not to answer. Average age of respondents was 21.5 years old. Thirty percent of students participated in Saturday Scrubs only, 38% participated in Summer Scrubs only, and 32% participated in both Saturday and Summer Scrubs programs. All students who responded to the survey are currently attending/attended University or Community College
upon graduation from high school. 29% of respondents are in the pursuit of a medical or graduate degree, and 46% of respondents are not currently pursuing but plan to in the future. Out of the 214 respondents, 27 students are currently enrolled in medical school. Average Likert scale values were calculated for respondents with the scale of 1=strongly disagree to 5=strongly agree. "Saturday Scrubs influenced my decision to pursue my current job or degree" was ranked on average as a 4.01/5. "Summer Scrubs influenced my decision to pursue my current job or degree" was ranked as 4.17/5. "The UA College of Medicine Phoenix Pipeline Programs (Saturday/Summer Scrubs) are influential in helping high schoolers learn more about careers in STEM/healthcare" was ranked as a 4.65/5.

Conclusion: The study demonstrates the positive impact of Saturday Scrubs and Summer Scrubs on high school students' career choices, particularly in pursuing healthcare professions. Despite challenges such as outdated contact information and incomplete survey responses, the study's findings highlight benefits such as early exposure to various healthcare careers and opportunities for mentorship. These results emphasize the need for similar STEM outreach initiatives in other medical schools, particularly to engage rural students. Expanding these programs can broaden access to medical education and contribute to the development of future medical professionals, fostering a more diverse healthcare workforce.

(34) Gender disparity among authors in anesthesiology: A retrospective cohort analysis from the journal of Anesthesiology

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Objective: To determine whether there is a disparity between genders as first, second, or last authors in the publication of original research.

Introduction: Gender disparity in medical research has recently emerged as a critical area of study.[1] Despite increasing awareness, women remain underrepresented in research authorship and positions of leadership in many medical fields.[2] Recent studies have highlighted significant gaps in gender representation in both the authorship of clinical research publications as well as the citations of female-authored publications in high impact journals.[2] Anesthesiology, as a medical field with growing educational research output and a strong influence on perioperative care, presents a unique opportunity to assess gender representation in academic contributions.[3] Addressing these disparities will ensure that diverse perspectives are considered and contribute to improving patient care of all genders.

Methods: A retrospective cohort study was conducted on all original research articles published in *Anesthesiology* from January 1, 2019, to December 31, 2022. The total number of authors for each article was recorded, and the gender of each author was extracted. This data was then compared to the gender distribution of physicians in the workforce in 2019 and 2022. To ensure accuracy, 15% of the primary data was independently reviewed by a second abstractor, achieving 100% accuracy. Descriptive statistics were used to present the data, and comparisons were made using an uncorrected Kruskal-Wallis test, followed by a post-hoc Mann-Whitney U test. The difference between the percentage of authors and the percentage of physicians in the workforce was assessed using a one-sample proportion test.

Results: For original research publications in *Anesthesiology* in the year 2019, women accounted for 25.1% of first authors, 32.9% of second authors, and 14.2% of last authors compared to 25.9% of female anesthesiologists in the workplace. While the first author results are not statistically significant ($p = 0.817$), second authorship was significantly higher ($p = 0.025$), and last author results were significantly lower ($p < .001$). Men in 2019 accounted for 74.9% of first authors, 42.9% of second authors, and 74.4% of last authors compared to 74.1% of male anesthesiologists in the workforce. While the first and last authorship results are not statistically significant ($p = 0.877$ and $p = 0.999$ respectively), the second author results are significantly lower for men ($p < 0.001$). Results from 2021 alone are not statistically significant, with female last authors accounting for 15.9% of publications compared to the 26.1% of female anesthesiologists in the workforce ($p=0.055$).

	2019 (n=219)	2020 (n=154)	2021 (n=94)	2022 (n=69)	p-value
Total number of authors	1262	1455	862	621	<0.001
Female authors					
First	55	43	27	21	0.004
Second	72	50	31	23	<0.001
Last	31	24	15	11	0.086
Male authors					
First	164	111	67	48	<0.001
Second	94	103	62	45	<0.001
Last	163	130	79	57	<0.001

Table 1: Baseline degree demographics of first, second, and last authors

	Percentage of Authors	Percentage in Workforce	p-value
Female authors			
First	30.4	26.1	0.412
Second	33.3	26.1	0.172
Last	15.9	26.1	0.055
Male authors			
First	69.6	73.9	0.412
Second	65.2	73.9	0.102
Last	78.3	73.9	0.130

Table 2: Comparison of authorship degree and the number of active physicians in the anesthesiology with allopathic and osteopathic degrees in 2021

	Percentage of Authors	Percentage in Workforce	p-value
Female authors			
First	25.1	25.9	0.817
Second	32.9	25.9	0.025
Last	14.2	25.9	<0.001
Male authors			
First	74.9	74.1	0.877
Second	42.9	74.1	<0.001
Last	74.4	74.1	0.999

Table 3: Comparison of authorship degree and the number of active physicians in the anesthesiology with allopathic and osteopathic degrees in 2019

Discussion: There exists a disparity in authorship trends between men and women regarding second and last authors specifically in original anesthesiology research. Additionally, this disparity has seemingly been shrinking in recent years. Ongoing data collection in subsequent years and in other journals may further elucidate this trend.

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(35) Analysis of Osteopathic and Female Authorship in Orthopedic Surgery Journals from 2019-2022

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Introduction: Osteopathic physicians (DOs) have had a history of being underrepresented in research, markedly demonstrated by the lack of NIH funding and representation in editorial boards (1,2). This underrepresentation is more striking in competitive specialties such as dermatology, neurosurgery, orthopedic surgery, etc (3,4). In recent years, there has been an increase in DO presence in academic publishing (2,5). Considering that osteopathic physicians receive additional training in musculoskeletal systems, and the rising number of DOs in orthopedic surgery, it is imperative to study the trends of DO authorship in this field (5,6). We aim to analyze these trends, focusing on the role that osteopathically trained physicians have in orthopedic surgery literature. In doing so, we hope to shed light on ongoing changes within the field and advocate for greater inclusion and equity of osteopathic physicians in research. These efforts may improve diversity of perspectives in the field, leading to advancements in patient care and surgical outcomes.

Methods: A retrospective cohort of original research from the Journal of the American Academy of Orthopedic Surgeons (JAAOS), Clinical Orthopaedics and Related Research (CORR), The Journal of Bone and Joint Surgery (JBJS), Foot and Ankle International (FAI), and the Journal of Shoulder and Elbow Surgery (JSES) from the first six months of 2019 through 2022 will be included in final analysis. Data to be abstracted will include the medical degree (MD, DO, or Other) and gender (male, female, or unknown) for the first, second, and last author for published manuscript. If unable to determine medical degree or gender, an internet search will be conducted using the author's name and institution noted on the manuscript. Basic descriptive statistics and an uncorrected analysis of variance followed by a t- test will be used to determine significance. A one sample proportion test will be used to determine if there is a difference between the percentage of published osteopathic and female authors as compared to those in clinical practice.

Results: Data from 2019-2021 has been collected on 1219 manuscripts and interim analysis shows that osteopathic physicians account for 1.61% of all first authors and 1.03% of all last authors in the sample. Similarly, females account for 16.2% of all first authors and 10.6% of all last authors. Males accounted for 83.4% of first authors, 77.7% of second authors, and 89.2% of last authors. Further analysis is pending data acquisition currently.

Discussion: Our study highlights the representation of osteopathic and female authors in high impact orthopedic surgery literature from 2019-2022. Preliminary findings from data collected 2019-2021 imply a disparity between the roughly 6% of practicing female orthopedic surgeons in the United States (7) and the roughly 7% of osteopathic orthopedic surgeons (8) with literature representation.

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*Human Rights and Extreme Heat: Addressing Heat-Related Mortality and Social Inequities in Arizona

(NOT PRESENTED LIVE TODAY!)

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Introduction: Phoenix, Arizona, is facing unprecedented heat challenges as temperatures rise to historic levels and climate change intensifies, disproportionately impacting vulnerable populations. This study explores the intersection of human rights and the public health emergency of heat-related illnesses. 645 people died in Maricopa County from heat-related illnesses alone in 2023—some experts believe the true number is higher. An estimated 45 percent of these deaths are people who are experiencing homelessness. In 2024, Phoenix had a record of 70 days over 110 degrees, with the normal number of 110-degree days being 21.

Objective: Our team is particularly looking at the social determinants of health in relation to heat stroke prevention and death. Marginalized groups are facing the biggest brunt of the heat emergency in Arizona due to lack of resources.

Methods: We obtained data from the Center of Health Information and Research at Arizona State University that assessed the total number of deaths, heat deaths, drug deaths, and alcohol deaths from every county in Arizona from 2017 to 2023.

Results: We found that alcohol and drug deaths in a county are positively correlated with heat deaths. Maricopa County—home to Phoenix and 4.5 million people—had a correlation of 0.77 for heat and drug deaths and 0.44 for heat and alcohol deaths. Pima County, with a population of 1 million people, had a correlation of 0.29 for heat and drug deaths and 0.33 for alcohol and heat deaths. Yuma County is the sunniest city in the United States with a more rural population density. Yuma had a heat and drug death correlation of 0.14 and 0.26 for alcohol and heat. Our results indicate that more urban areas have a higher correlation between heat deaths with alcohol and drug overdoses.

Conclusion: We hypothesize that, because of inaccessible social services for unhoused and underprivileged populations in high-population and large metro areas such as Phoenix, it is difficult for these people to obtain potentially life-saving heat prevention resources. By underscoring these disparities, our research calls for a human rights approach to address the escalating heat crisis, advocating for more robust policy solutions. We believe that expanding access to hydration stations, shaded areas, and cooling centers, along with tailored support for individuals at risk, are essential steps toward ensuring that all people can live safely in extreme heat conditions.

Financial interests: None.

*Medical Student Attitudes Towards Healthcare Sustainability in Education

(NOT PRESENTING LIVE TODAY!)

Authors: Elisa Bass BA, Rachel Fisher MS, Suraj Puvvadi BS, Nisha Reddy, Neera Agrwal MD PhD.
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Introduction: Healthcare sustainability is a developing area of interest among medical students as health systems focus increasingly on sustainability efforts[1-6]. The Sustainability in Medicine Selective is an optional student-run extracurricular course developed at the Mayo Clinic Alix School of Medicine (MCASOM) to provide education on healthcare sustainability, offered for the first time as a series of lectures occurring primarily between January and July of 2024. While student-run programs at other institutions and research on student perspectives on sustainability already exist, there are no studies aiming to identify student attitudes towards healthcare sustainability before and after offering an educational intervention. We hypothesized that most medical students support curriculum addressing healthcare sustainability and that interest in sustainability work in one's career would increase after the introduction of an optional medical sustainability-oriented curriculum.

Methods: We conducted two anonymous online surveys before and after the main series of lectures for the Sustainability in Medicine Selective in January and July of 2024, respectively. The surveys were distributed to the entire MCASOM student body through school email lists. Statistical significance was calculated using chi-squared tests. The study outcomes were student perspectives on the need for curriculum addressing healthcare sustainability in medical education, the desire to be involved in sustainability work in one's career, and the ideal phase of medical training and format of curriculum for education on healthcare sustainability.

Results: The response rates for the January and July surveys were 7.7% and 10.6%, respectively. From the first to the second survey, there was a significant increase in strength of agreement with the statement "Healthcare sustainability should be taught in medical training" with an increase in the percent who strongly agreed from 35.3% to 55.3% ($p = 0.008$) and more than 82% agreed with the statement in both surveys. Significantly more students expressed a desire to be involved in healthcare sustainability work in their career, with an increase from 52.9% to 72.3% ($p = 0.007$) (Figure 1). More than 70% of those unopposed to a healthcare sustainability curriculum identified the preclinical medical school curriculum and residency as phases of medical training when the curriculum should be taught. More than 80% of respondents identified integration as a theme throughout medical school as an ideal format for healthcare sustainability education in medical school (Figure 2).

Discussion: The offering of an optional healthcare sustainability-focused curriculum was associated with an increase in strength of student belief in the importance of sustainability education and an increased desire to be involved in sustainability work in one's career. However, integration as a theme throughout multiple phases of medical education was consistently and overwhelmingly preferred to a separate student-run course as the format of curriculum in healthcare sustainability. While extracurricular student-run courses are a short-term solution for providing education on healthcare sustainability, an integrated curriculum aligned with the primary coursework is needed to best meet student interest on this developing topic.

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Figure 1. Desired involvement in sustainability work in career

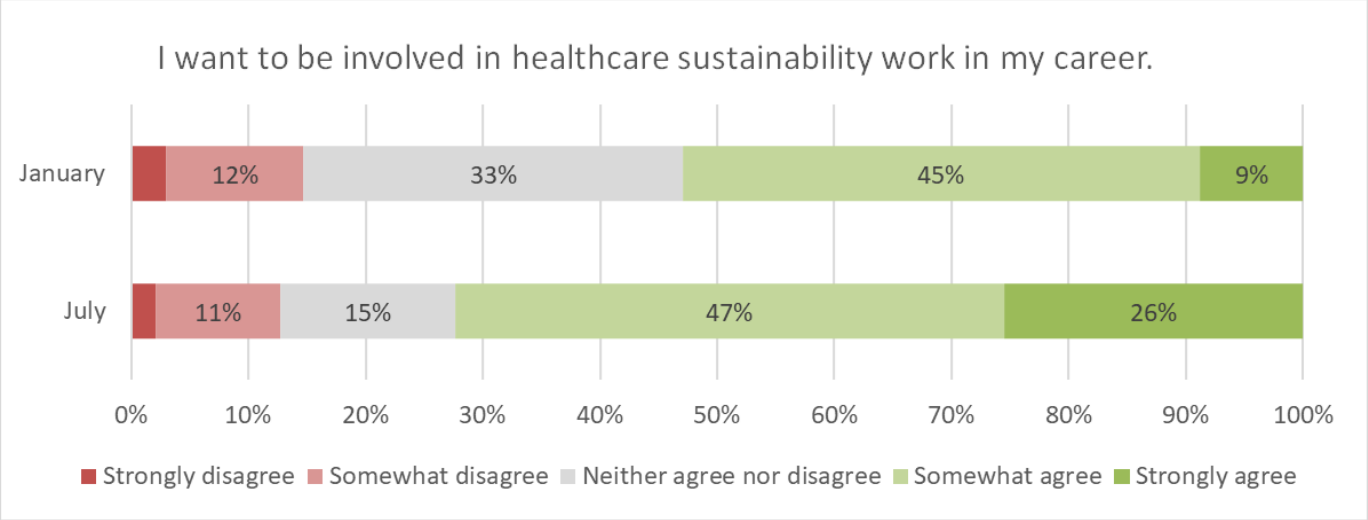
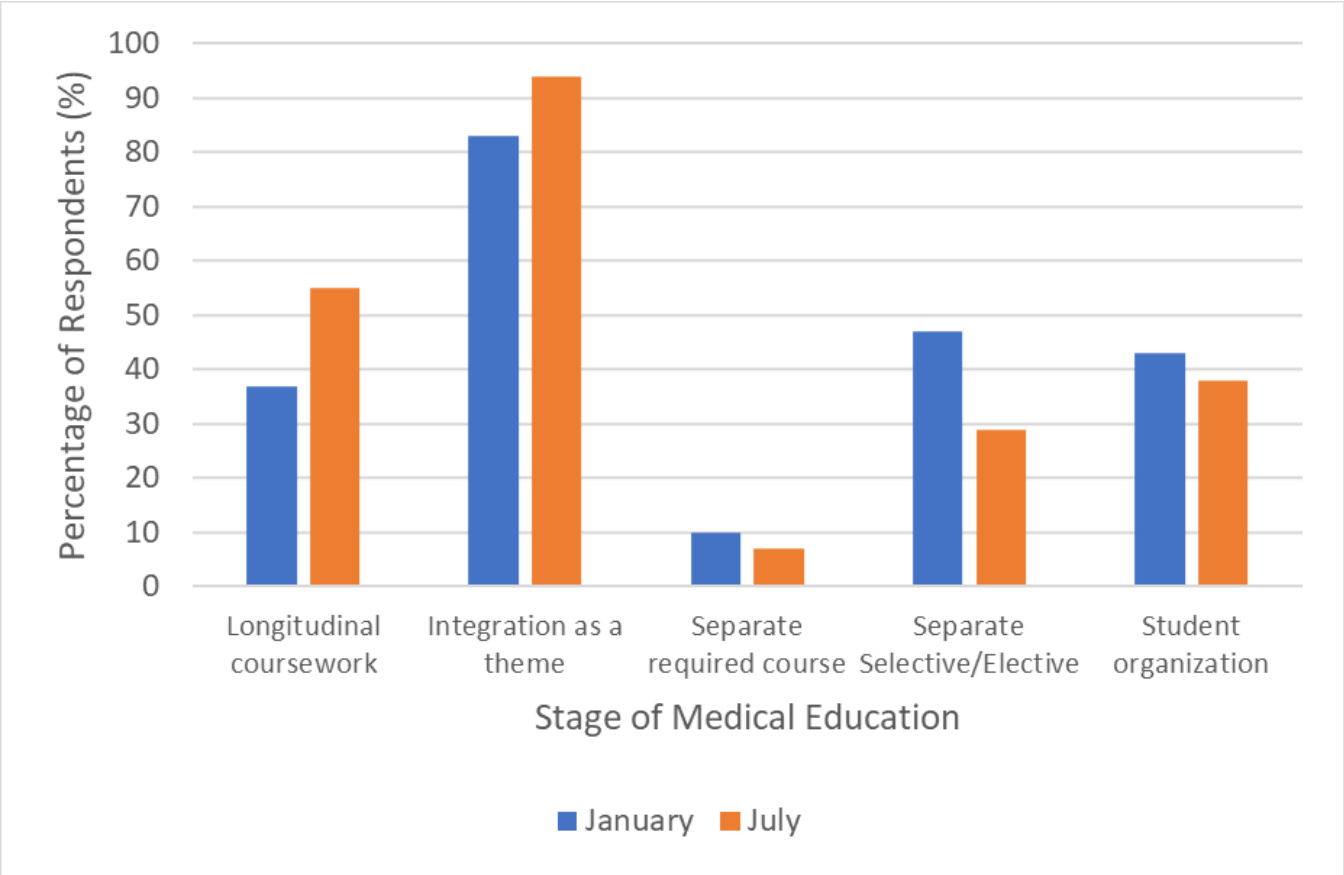


Figure 2. Ideal format for healthcare sustainability curriculum



*Improving Medical Education Through Telemedicine: Student Perceptions and Paths to Optimization

(NOT PRESENTED LIVE TODAY!)

Authors: Jaxon Jeffery.
Affiliations: Mayo Clinic School Alix of Medicine

Introduction: The rapid evolution of telemedicine services as an integral part of healthcare delivery requires its integration into medical school education. Preparing future physicians for these types of patient encounters is essential to their preparation for a digitally integrated healthcare landscape where 30% of US adults used telemedicine in 2022.[1] This study evaluates medical student perceptions of telemedicine experiences incorporated into clinical and pre-clinical curricula. The study aims to evaluate the quality, relevance, and effectiveness in this growing healthcare domain.

Methods: A cross-sectional survey was distributed to medical students across all four years of training at all three campuses of Mayo Clinic Alix School of Medicine from 11/1/2024 - 12/6/2024. Inclusion criteria included current enrollment at the medical school and participation in a telemedicine experience as part of the curriculum. IRB and student research committee approvals were obtained. A modified version of a validated questionnaire 'Teaching Session Evaluation Tool' was used to evaluate overall video telehealth experience, with Likert-scale and open-ended questions. Key areas of assessment are included in the results below.

Results: Of 424 medical students surveyed, 78 (18.4%) responded. The cohort was primarily composed of third year (33%) and fourth year (42%) students. Participants reported telehealth experiences across a range of specialties, most commonly family medicine (31%), internal medicine (24%), and obstetrics/gynecology (15%). Most students felt they understood their role (71%), found the content relevant to their learning objectives (78%), and considered the pace appropriate (90%) (% of agree/strongly agree). Overall, 76% agreed/strongly agreed that the visits were valuable for their learning. Physicians were rated highly for telehealth expertise and preparedness (91% and 98% agree/strongly agree). Open-ended feedback discussed the value of gaining practical experience with telemedicine through conducting virtual visits, navigating electronic health records, and observing physicians adapt to the modality. Students noted learning specific communication techniques and the growing importance of telemedicine in patient care. However, only half of students reported active participation (50% agreed/strongly agree), with qualitative feedback highlighting a desire for more hands-on involvement. Further analysis revealed the need for more pre-visit instructions, with only 49% of students reporting that these were adequate and 61% of students felt that sufficient time was allocated for post-visit teaching (% agree/strongly agree). This was further supported by responses emphasizing the need for clearer expectations, more explicit preparation, and the utility of debriefing to enhance learning from telehealth visits. (Figure 1)

Discussion: This study demonstrates that video telehealth integration into medical education is well-received by students, confirming its value in medical student training. While students recognized the relevance of telemedicine and rated physician instructors highly, our findings underscore key areas for improvement. Elevating the educational impact requires increasing active student participation. Furthermore, implementing clear pre-visit instructions outlining student roles and ensuring dedicated post-visit debriefing sessions is vital. Addressing these areas will refine telemedicine curricula and

enhance student preparedness. Future research should evaluate the impact of enhanced hands-on learning and structured pre- and post-visit protocols on student competence and confidence in utilizing telehealth.

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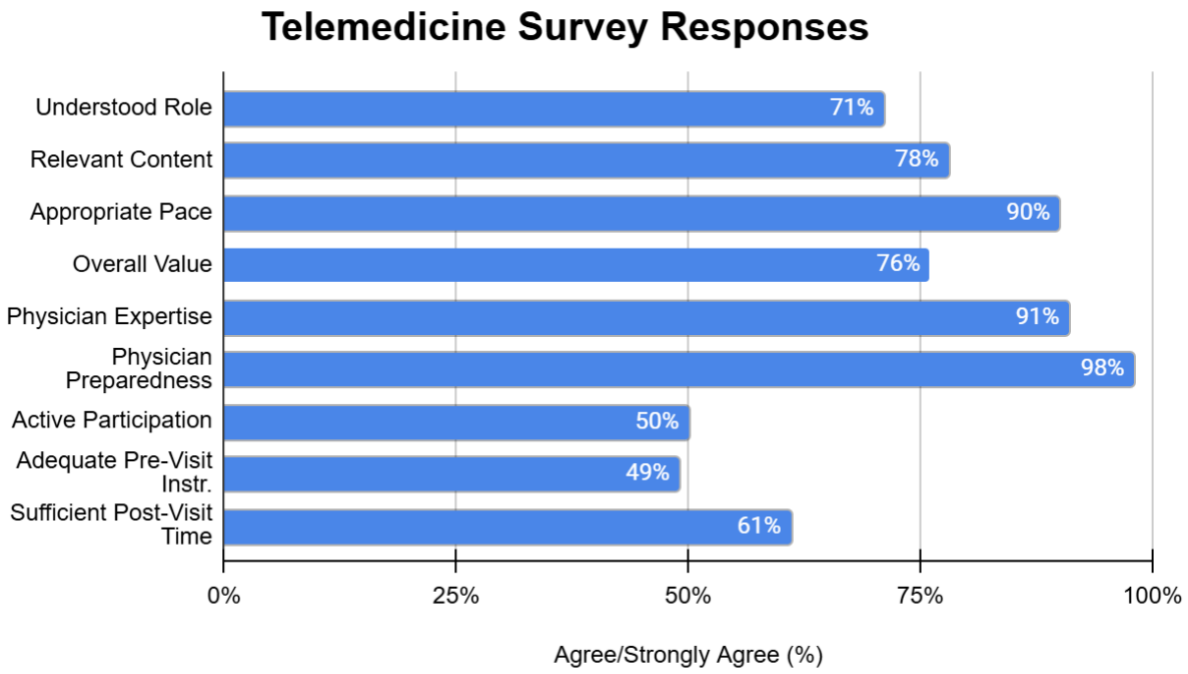
Figure 1



*Developing a Pediatric Mental Health Service Resource List for an Uninsured Medical Clinic

(NOT PRESENTED LIVE TODAY!)

Authors: Mika Verner, MSII and Pamela Murphy, MD.
Affiliation: Creighton School of Medicine – Phoenix.

Background: Pediatric mental health impacts a child's future mental health[1], development[2], and life outcomes.[3 4] Half of all lifetime mental health disorders emerge before age 14.[5] The American Academy of Pediatrics and other organizations have declared children's mental health a national emergency.[6] However, nearly half of children with mental health disorders did not receive needed treatment in 2019.[7] Availability and accessibility of mental health services for children, especially those from immigrant[8], non-English speaking[9], and uninsured families[10], present significant challenges. In Phoenix, at the Saint Vincent de Paul free medical clinic for uninsured patients, there was a need for a pediatric mental health community resource which offered low cost and non-English speaking services.

Objective: Assess the availability and accessibility of mental health resources in the Phoenix community for pediatric patients who are from low-income, immigrant, non-English speaking, and uninsured backgrounds, and develop a resource tool for this population.

Methods: A first-year medical student from Creighton University School of Medicine Phoenix Regional Campus compiled a list of local mental health organizations to create a referral list for pediatric patients at the free medical clinic. Government databases including Arizona 211, HRSA, and findtreatment.org, and non-profit resources similar to Mental Health America were searched for community listings. Google was also used by entering keywords like “pediatric mental health clinic,” “children’s mental health clinic,” “low-cost mental health services,” and “uninsured mental health services.” Information was gathered for each organization by researching their website and following up with an email or call if needed. These included ages seen, low-cost or sliding fee scale availability, acceptance of uninsured patients, services provided, non-English speaking providers, wait time, and telehealth availability. This information determined if the organization was fit for the referral list. Priority was given to resources with pediatric mental health services, long-term treatment, sliding fee scale or low-cost programs, non-English speaking providers, and uninsured patient acceptance. Organizations meeting four or more criteria were considered.

Results: A total of 71 resources were contacted. 47 facilities responded to be evaluated for the referral list. Of the 47 resources evaluated, 11[1] resources fit all five criteria and three resources fit four of the criteria. Twelve resources were chosen, including the name, location, phone number, ages seen, and Spanish-speaking ability. One did not meet all criteria, but was added as it offered free to low-cost short term care. The referral list was created using Canva and is available in English and Spanish as a print copy and via a QR code that links to the online document. The QR code updates in real time as the list is revised.

Conclusion: The project found low accessibility to low-cost mental health services for uninsured, non-English speaking pediatric patients in Phoenix. Although we developed a resource of 12 programs, we

were dismayed by the lack of available resources, information online, facility response, and organized resources. The next step is to evaluate the referral list's effectiveness and usage.

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(36) Recent trends in relative survival rates of eye and orbital cancer: A SEER analysis from 2004 through 2021

Authors: Caitlyn Cooper, Yannis M. Paulus, MD, and John Ashurst DO, EdD, MS
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Introduction: Currently, there is a paucity of data examining the effect of sex on survival in eye and orbital cancers. Given the limited data, this study seeks to determine the survival rates of eye and orbital cancer between the sexes based upon age at diagnosis and stage.

Methods: The National Cancer Institute's Surveillance, Epidemiology, and End Results Program (SEER) (https://seer.cancer.gov/statistics-network/explorer/) was queried to determine relative survival rates of male and female patients diagnosed with eye and orbital cancer from 2004 through 2021. Relative survival rates were defined by SEER as a ratio of the proportion of observed survivors in a cohort of cancer patients to the proportion of expected survivors in a comparable set of cancer free individuals. Data evaluated included biological sex (male, female), age (<50 years, 50-64 years, <65 years), and stage (localized, regional, unstaged). Data was analyzed using the Mann Whitney U test with a statistical significance set as a p value of less than or equal to 0.05.

Results: Females were more likely to survive eye and orbital cancer at one (97.94 vs 97.39; p=0.02), three (91.59 vs 89.51; p=0.006), and ten (76.76 vs 74.84; p=0.05) years as compared to their male counterparts. When examining age subgroups, women aged between 50-54 were more likely to survive eye and orbital cancer at three (91.92 vs 88.25; p=0.03) and ten (75.41 vs 71.46; p=0.008) years as compared to males. Similarly, women aged less than 50 years at ten (87.17 vs 84.46; p=0.03) years were also more likely to survive eye and orbital cancer as compared to males. When examining staging, women were more likely to survive local eye and orbital cancer at three (94.40 vs 92.95; p=0.001) years and regional eye and orbital cancer at one (96.85 vs 93.54; p=0.025) year as compared to males.

Discussion: Based upon the SEER database, females are more likely to survive eye and orbital cancer at one, three, and ten years. Data also shows that females are more likely to survive localized and regional eye and orbital cancer as compared to males at three and one year respectively. Further research is needed to examine reasons for this sex difference and the survivability of specific cancer subtypes.

(37) Etanercept Use Prior to COVID-19 Diagnosis Reduces Risk of Severe Outcomes in Rheumatoid Arthritis Patients

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Methods: The TriNetX Database was queried to identify patients ≥ 18 years old with Rheumatoid Arthritis and a Sars-Covid-19 diagnosis. These individuals were then divided into two subgroups: those prescribed Etanrecept anytime between 1 year and 1 day before the index infection (n=16,141) and those who were not (n=235,818). These groups were 1:1 propensity score matched (n=15,912) for age, sex, ethnicity, Sars-Covid-19 exposure, Sars-Covid-19 vaccination, diabetes mellitus, BMI, and acute/chronic respiratory failure. 30-day, 90-day, and 1-year outcomes of SARS-COVID-19 within one year of medication prescription were compared between each cohort using Risk Ratios(RR), and statistical significance was set to $p<0.05$. The outcomes were Ventilator Use, Mortality, Loss of Smell, Loss of Taste, Hospital Admission, and Oxygen Administration.

Results: Patients not prescribed Etanrecept before Sars-Covid-19 diagnoses had a significantly higher 30-day risk of Ventilator Use (RR=1.454, p=0.001), Mortality (RR=1.761, p<0.001), and Hospital Admission (RR=1.290, p<0.001), the significantly higher 90-day risk of Ventilator Use (RR=1.329, p=0.005), Mortality (RR=1.424, p<0.001), and Hospital Admission (RR=1.317, p<0.001), and significantly higher 1-year risk of Ventilator Use (RR=1.348, p=0.001), Mortality (RR=1.215, p=0.003), and Hospital Admission (RR=1.120, p<0.001).

Discussion: Our study suggests a beneficial effect of Etanercept on COVID-19 outcomes in patients with Rheumatoid Arthritis. Patients receiving Etanercept required less ventilatory support during COVID-19 infection, indicating a milder disease course. This may be attributed to Etanercept's mechanism of action, which inhibits TNF-α and reduces inflammation. By mitigating inflammation, Etanercept not only helps control Rheumatoid Arthritis flare-ups but may also suppress the excessive inflammatory response associated with COVID-19. Therefore, more studies need to examine the efficacy of etanercept as a double agent for COVID-19 and Rheumatoid Arthritis.

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(38) PTSD Symptoms and Firearm Storage Practices Among Adults in the United States: Examining Trauma History Subgroups

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Background: Prior research, particularly in military samples, has shown that greater posttraumatic stress disorder (PTSD) hyperarousal symptoms are associated with an increased odds of storing personal firearms in a non-secure manner (e.g., loaded, unlocked). However, prior work has not examined whether this association differs as a function of the type of prior trauma exposure, namely victimization (e.g., physical or sexual assault) or accident/injury (e.g., motor vehicle accident, natural disaster). Victimization traumas, more so than accident/injury traumas, may spur concerns regarding interpersonal safety, thereby influencing firearm storage practices. While clinicians and researchers have been operating on conceptually coherent assumptions regarding these differences, a lack of empirical investigation leaves a critical gap in understanding the nuances of trauma-type effects on firearm storage.

Methods: Participants were 259 US adults who responded to an online survey panel and identified as firearm owners (30.5% of all respondents). Lifetime traumatic experiences and PTSD symptoms (overall and subfactors) were assessed via the Life Events Checklist for DSM-5 and the PTSD Checklist for DSM-5 (PCL-5; range: 0-80), respectively. Firearm ownership and storage practices (load and lock status) were assessed via a structured questionnaire.

Results: The mean PCL-5 score among the sample was 17.2 (*SD* = 17.38). Among participants with a victimization trauma history (49.8%; *n*=129), PTSD hyperarousal symptoms were associated with an increased odds of storing firearms loaded (OR=1.10 [95% CI=1.01-1.19], *p*=.029). Among those with an accident/injury trauma history but no victimization history (30.5%; *n*=79), there were no significant associations between PTSD symptoms (overall or hyperarousal-specific) and firearm storage practices.

Discussion: Among adults who have experienced a victimization trauma, greater hyperarousal symptoms, characterized in part by hypervigilance to threat, were associated with increased odds of storing firearms loaded. However, effect sizes were small, and PTSD symptoms were not associated with other storage practices (e.g., lock status). The unselected sample of US adults with generally low PTSD symptom levels may have contributed to statistically small effect sizes; thus, future work is needed in samples of individuals with higher PTSD symptom levels, including those diagnosed with PTSD.

(39) The Impact of Depression and Anxiety on Outcomes of TAVR: A Propensity-Score Matched International Database Analysis

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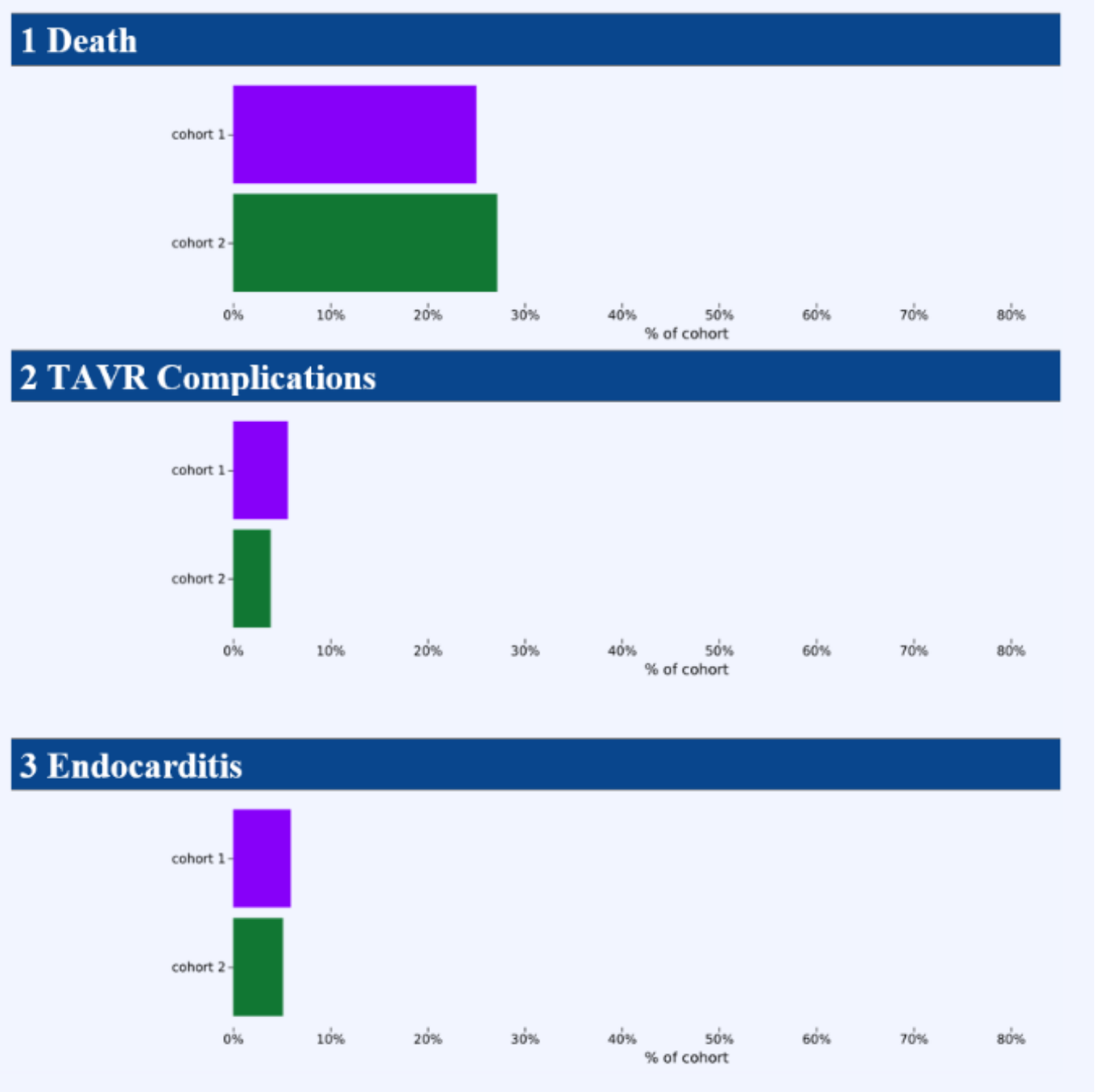
Introduction: Transcatheter aortic valve replacement (TAVR) is now a mainstay therapy for severe aortic stenosis in patients at high surgical risk. Meanwhile, depression and anxiety are prevalent in cardiovascular populations and have been shown to influence postoperative outcomes. This retrospective study examined whether these mental health conditions affect post-TAVR complications.

Methods: Two cohorts were formed, each with 3,121 patients. Cohort A ("Depression/TAVR") included patients with ICD-10 F41.1 or F33 diagnoses preceding TAVR; Cohort B ("TAVR without depression") had no such diagnoses. Propensity score matching balanced demographic factors (age, sex, race/ethnicity) and clinical variables (e.g., hypertension, ischemic heart disease, diabetes). Outcomes included death, TAVR-related mechanical complications (ICD-10 T82.0), and endocarditis (ICD-10 I38, I39). TriNetX's measure-of-association and Kaplan-Meier survival analyses were used to compare post-TAVR outcomes.

Results: Following propensity matching, mortality risk was 25.0% (781/3,121) in Cohort A vs. 27.2% (848/3,121) in Cohort B (risk difference –0.021; p=0.053). Median survival was similar between groups (~2,000 days). However, TAVR-related mechanical complications were significantly higher in the Cohort A (5.6% vs. 3.9%; p=0.001; OR 1.48, 95% CI 1.16–1.89). Survival analysis showed a hazard ratio of 1.52 (95% CI 1.20–1.93). Endocarditis incidence was 5.9% vs. 5.1% (p=0.197).

Discussion: Despite concerns that mental health diagnoses might worsen survival, preexisting depression or anxiety did not significantly increase mortality after TAVR. Instead, these conditions correlated with a higher risk of mechanical complications, possibly reflecting challenges with post-procedure adherence, additional physiological stress responses, or reduced access to consistent social support. Endocarditis risk did not differ significantly, indicating infection-related outcomes may hinge on other factors. These findings underscore the importance of integrating mental health support into TAVR management, as earlier identification of depression or anxiety and closer monitoring of device function could help mitigate adverse events and improve long-term patient well-being.
Depression or anxiety did not raise TAVR mortality but was linked to more mechanical complications. A comprehensive care model that addresses both cardiac and mental health needs may optimize outcomes and enhance patient recovery after TAVR.

Figure 1. Rates of Death, TAVR Complications, and Endocarditis in Patients in Cohorts 1 and 2



(40) Assessing ASCVD preventative screenings for uninsured patients in a Free Medical Clinic: A Quality Improvement Project

Authors: Esai Ponce, BSE, MS, Luis Dominguez, BS, Manav Singh, BS, John Anwar, MD
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Introduction: Over 26 million people in the U.S. do not have health insurance. Some individuals visit free or discounted medical facilities as an alternative to seeking medical care. This project assesses the quality of care in a Phoenix-based free medical clinic setting, specifically regarding patients' ASCVD (Atherosclerotic Cardiovascular Disease) risk and USPSTF (U.S. Preventive Services Task Force) recommendations for Statin use. The focus lies in managing ASCVD risk when tied to routine and recommended preventative medicine screenings in patients at St. Vincent de Paul's Medical Clinic (SVDP). The primary objective is to ensure that patients who fall within the recommended age range (40-75 years) with an elevated ASCVD are keeping up to date with their medical care and being managed accordingly per USPSTF guidelines.

Case Presentation: USPSTF current guidelines recommend the use of a Statin for primary prevention of cardiovascular disease in Adults if the patient is between ages 40-75 who have one or more cardiovascular risk factors (dyslipidemia, smoking, diabetes, hypertension) and an estimated 10-year risk of a cardiovascular event of 10% or greater. Currently listed as a Grade B recommendation. SVDP is a free transitional medical clinic that focuses on primary care that sees only uninsured patients staffed by majority volunteer physicians. Therefore, it is important for the clinic to follow the USPSTF guidelines to push for preventative medicine in this underserved patient population.

Clinical Impacts/Relevance: Of the 957 patients reviewed, 89 lipid panel tests were noted as due or missing for patients who needed a lipid panel due to comorbidities (obesity, diabetes, hypertension). After the lipid panels had been ordered and test results received, the ASCVD risk score for these patients was calculated. Only 30 patients of the 89 got their blood drawn for the lipid panel. 2 out of the 30 pts who were able to receive an updated lipid panel and exceeded the ASCVD risk score (10%) received further treatment (statin prescribed). The other 28 pts were either on a statin or did not meet the criteria for a statin per USPSTF.

Discussion: Cholesterol management and screening is an important preventive care measure, as high cholesterol levels can increase the likelihood of having cardiovascular events such as heart attacks or strokes in the next few years if left untreated. Those in generally underserved and uninsured populations are at an even greater disadvantage due to the barriers to health care. SVDP is a free medical clinic that serves these underserved patient populations and therefore is important for clinics like these to remain up to date on their USPSTF screening guidelines for their patients. SVDP, whose patients are seen majority by volunteer physicians, was found to have about 10% of cholesterol screening and ASCVD screenings missing for patients who met the criteria for such screenings. By implementing this yearly report, the project managed to screen an additional 30 patients, 2 of which needed a Statin medication.

(41) Inpatient and Outpatient Trends of Total Ankle Arthroplasty

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Intro: Total Ankle Arthroplasty (TAA) is a surgical treatment option for ankle joint arthritis. Recent trends have shown an increase in TAA utilization in the United States due to improved prostheses and positive associated outcomes. This study aims to update these trends for both inpatient and outpatient TAA.

Methods: The National Inpatient Sample (NIS) and the National Ambulatory Surgery Sample (NASS) were queried from 2012-2020 and 2016-2020, respectively. The Cochran Armitage test for proportion test of trends was used to analyze significance of time trends across the years. Trends were plotted and analyzed for outpatient/inpatient, gender, and age group. Trends in hospital charge, hospital cost, and length of stay were also assessed for the overall inpatient and outpatient samples as appropriate.

Results: TAA inpatient utilization has increased from 1.14 to 2.15 to 2.00 per 100,000 in 2012, then 2019, then 2020, respectively. Outpatient utilization increased from 0.32 to 0.72 per 100,000 in 2016 to 2020 ($p<0.001$). Men tended to make up the majority of patient undergoing TAA every year, both inpatient and outpatient, except for the year 2012. However, both sexes showed an overall increase in the incidence of TAA ($p<0.001$). Patients between the ages of 65 and 79 were the largest proportion of patients undergoing inpatient TAA (44.4% in 2012 to 55.6% in 2020), while patients between the age of 50 and 64 were the largest proportion of patients undergoing outpatient TAA (55.9% in 2016 to 58.0% in 2020). Elixhauser comorbidity index average has increased in both inpatient (1.60 to 1.77 from 2012 to 2020) and outpatient TAA (1.22 to 1.40 from 2016 to 2020) both $p<0.001$. Length of stay decreased from 2.19 days to 1.44 days in the inpatient sample ($p<0.001$). Finally, inpatient hospital charges in $10,000 have increased from 7.3 to 8.8 from 2012 to 2020 ($p<0.001$), and, similarly, outpatient hospital charges in $10,000 have also increased from 7.9 to 8.8 from 2016 to 2020 ($p<0.001$).

Discussion: The utilization rate of TAA has seen a marked increase since 2012 in both inpatient and outpatient settings. The length of stay has continued to decrease while the comorbidity index of the individuals receiving TAA has increased indicating the optimization of this procedure. With charges continuing to increase it is important to continue to optimize this procedure due to its potential to be done on an outpatient basis.

Figure 1.

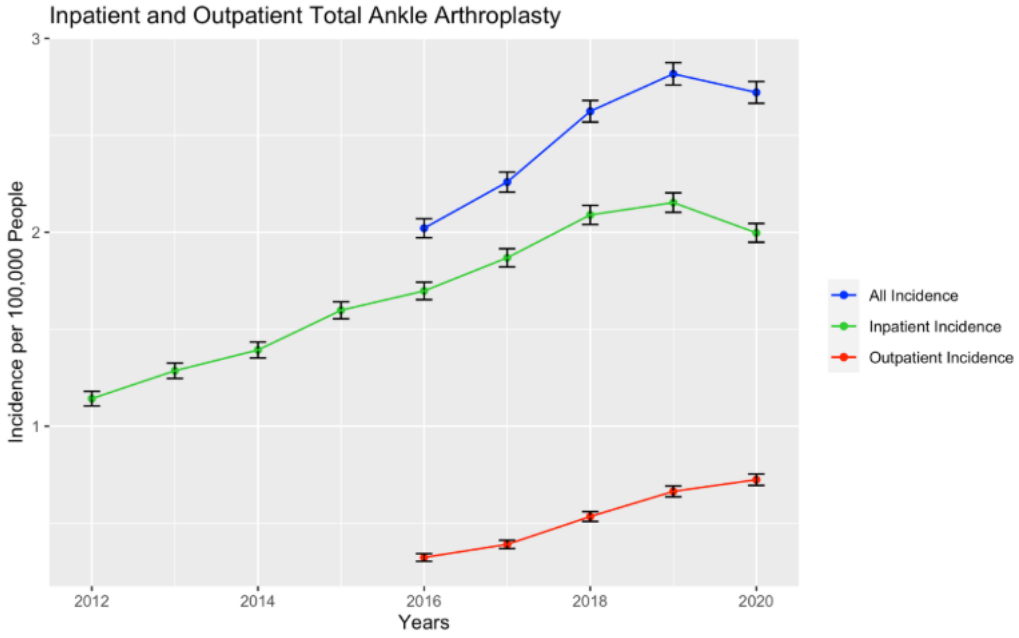
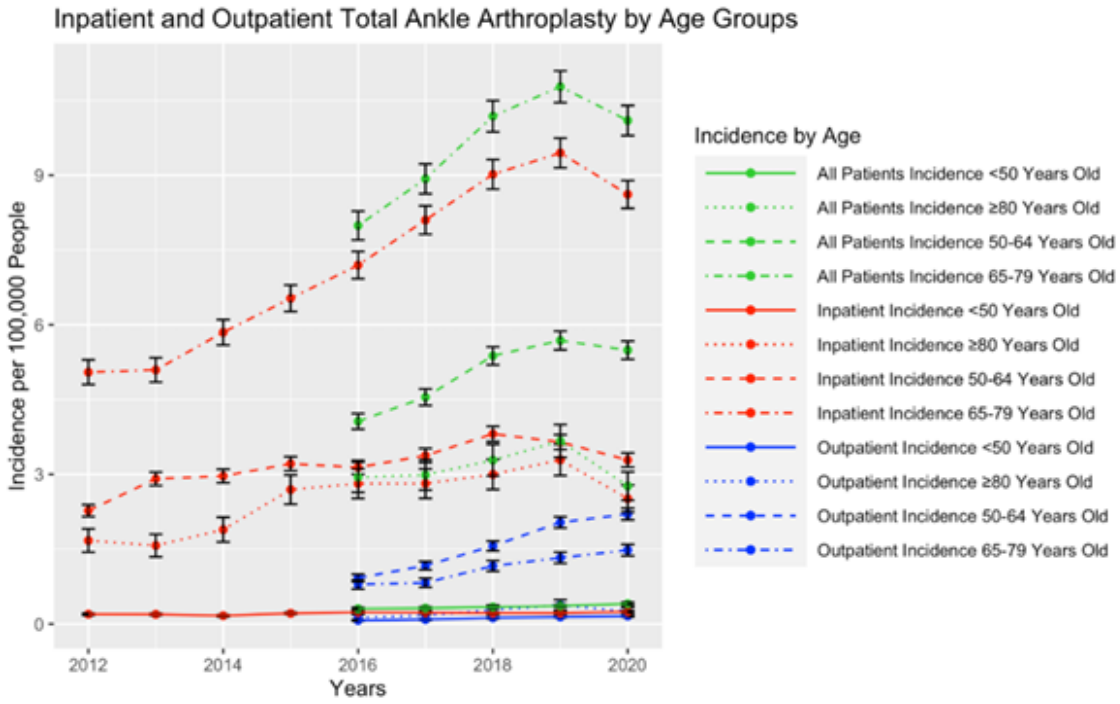


Figure 2.



(42) Neurological Symptom Mapping for Acute Ischemic Stroke - A Novel Tool for Predicting Occlusion Location

Authors: Jean Bernard Salloum, Tarek Al Shaher Belhadad, Rocky Rafi, Arshan Halkor, Ahmed Pasha, Matthew Dinh, Dr. John Ashurst

Introduction

Background: The accurate and timely identification of stroke location is critical for effective treatment due to the devastating potential outcomes if not promptly diagnosed[1]. Current diagnostic methods primarily rely on neuroimaging, but imaging resources may be constrained, particularly in resource-limited settings or during initial evaluations. Furthermore, imaging studies may fail to detect small strokes and improper imaging techniques may lead to delayed diagnosis[2]. We present an innovative tool that integrates physical exam findings in our evidence based algorithm to aid in timely diagnosis of ischemic strokes.

Objective: This study aims to explore the development process and efficacy of our automated diagnostic model in identifying acute ischemic strokes based on neurological presentation.

Method

Tool Overview: Our diagnostic tool was designed through a custom algorithm in Microsoft Excel that designates a most likely stroke diagnosis based on the responses to our 21 item questionnaire. The tool employs a summative point system wherein each symptom in the questionnaire is attributed a point; these scores are aggregated to generate a total which is cross-referenced against a database of stroke diagnoses. By ranking the possible diagnoses, the tool provides a prioritized differential list, aiding in the identification of the most likely ischemic stroke.

Validation Process

Source Validation: All stroke-related data, including neuroanatomical correlations and presenting symptoms, were validated using reputable medical textbooks[3,4,5], corroborated with additional literature from reputable journals.

Model Testing: We extracted stroke data from case reports in peer-reviewed journals, including the acute symptoms, confirmatory imaging findings, and other relevant clinical characteristics. All reports were selected using a standardized search query and the following inclusion criteria: minimum of 2 neurological signs - 1 being a classic sign across different strokes[6], imaging confirmation, and published after the year 2000. The extracted patient data is inputted into our predictive tool to validate the accuracy and utility in stroke localization by comparing its predictions with confirmed stroke locations on imaging. All collected data is securely stored in compliance with the standards of the local IRB chapter for further refinement of the tool.

Results: Through our literature review, we categorized 20 unique strokes with localizing symptoms. We identified 95 case reports matching our inclusion criteria. On preliminary testing, our tool demonstrates an overall sensitivity of 80.8%, with anterior cerebral artery strokes having the greatest sensitivity and anterior choroidal artery strokes having the lowest. Interestingly, when only 2 neurological symptoms were present on initial patient presentation, prior to a full neurological evaluation, the model demonstrated comparable sensitivity in localizing the correct stroke location (80% vs 83.3%).

Discussion: Our diagnostic tool demonstrates promise in enhancing clinicians' efficiency in accurately identifying strokes, particularly with challenging radiological cases. These findings highlight this tool's potential role in supporting timely and confident decision-making in stroke care. Further studies are needed to validate the model using retrospective and prospective data of ischemic stroke patients, particularly those in emergency departments. Additionally, studies to determine the utility of the tool as an educational aid is warranted.

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(43) Rotator Cuff Pathology in Patients Taking GLP-1 Receptor Agonists: A Cohort Study

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Introduction: GLP-1 RAs are known for their anti-inflammatory and tissue-preserving properties, but their effects on musculoskeletal health remain underexplored. This study evaluated the impact of GLP-1 receptor agonists (GLP-1 RAs) on the incidence of rotator cuff tears and surgical outcomes in patients stratified by obesity and type 2 diabetes mellitus (T2DM) status.

Methods: A retrospective cohort analysis was performed using de-identified electronic health records from the TriNetX database. Patients were divided into six cohorts based on GLP-1 RA use, obesity status (BMI ≥30 kg/m²), and T2DM diagnosis. Propensity score matching was applied to balance baseline characteristics between groups. Outcomes were assessed over a five-year follow-up period, focusing on the incidence of rotator cuff tears and surgical repair rates.

Results: Among non-obese patients with T2DM, the incidence of rotator cuff tears was 8.3% in the GLP-1 RA group (n=128,550) versus 12.7% in the non-GLP-1 RA group (n=3,252,717), with surgical repair rates of 3.5% and 5.4%, respectively. In obese patients with T2DM, the incidence of rotator cuff tears was 7.1% in the GLP-1 RA group (n=54,735) compared to 10.8% in the non-GLP-1 RA group (n=547,871), and surgical repair rates were 2.9% and 4.3%, respectively. Among obese patients without T2DM, the incidence of rotator cuff tears was 6.2% in the GLP-1 RA group (n=7,679) versus 9.4% in the non-GLP-1 RA group (n=1,347,686), with surgical repair rates of 2.5% and 3.9%, respectively.

Discussion: These findings demonstrate that GLP-1 RA use is associated with a lower incidence of rotator cuff tears and reduced surgical repair rates across all subgroups, irrespective of T2DM or obesity status. The results align with prior evidence of GLP-1 RAs' anti-inflammatory effects and suggest potential benefits for musculoskeletal health. Future studies should explore the mechanisms driving these associations and validate the findings through prospective research, offering new insights into GLP-1 RA applications in musculoskeletal care.

(44) Advancing Pediatric Limb Reconstruction: Insights from the Use of Magnetic Nails in Tibia Lengthening

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Introduction: Intramedullary nails such as the PRECICE system offer reduced complication rates compared to traditional external fixators in the treatment of limb length discrepancy (LLD).[1] Recent availability of smaller nails expanded application to include pediatric limbs, particularly tibias.[2,3] There are still limited reports investigating the use of intramedullary nails in pediatric tibias. We seek to contribute to the literature with a single-center experience of PRECICE nails in tibial lengthening.

Methods: Four patients underwent internal tibial lengthening with the PRECICE system between 2020-2022 at our center. Relevant patient demographic data, nail characteristics, diagnoses, surgery details, and complications were extracted. Preoperative and postoperative radiographs were reviewed to determine distraction and consolidation characteristics. All data was tabulated in a secure spreadsheet for univariate analysis. Difficulties encountered during the treatment course were classified into problems, obstacles and complications as per Paley et al. Complications were classified using the modified Clavian-Dindo Classification. Additional surgeries needed include revision IM nailing and ORIF.

Results: The average age at surgery of the 4 patients was 14.75 years (range 13-17 years) with a mean follow-up of 1.92 years. Only one patient was lost to follow-up before consolidation completed. All surgeries involved an antegrade infrapatellar approach. Three LLDs were from congenital etiologies with the last being secondary to lipomyelomeningocele. The mean planned lengthening was 30 mm, and the mean distraction achieved was 27.8 mm across a distraction period of 34 ± 8.4 days (distraction index of 0.84 ± 0.20). Only one tibia consolidated without complications (consolidation index 104.2 days/cm). The patient lost to follow-up experienced delayed union. Of the remaining two patients, one experienced tibular/fibular nonunion requiring ORIF to achieve bone healing. The other experienced nonunion with resolution via bone stimulator (final consolidation index 232.6 days/cm).

Conclusion: Rates of complication in tibial lengthening with PRECICE systems may be high. An investigation into complication rates and risk factors may better characterize the utility of intramedullary nails in pediatric tibias.

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(45) Branching Out for Harvest: Medial Sural Artery Perforator Flap Anatomical Classification

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Introduction: The medial sural artery perforator (MSAP) flap has gained recent popularity for head and neck reconstruction. It carries advantages including a thin, pliable skin paddle, favorable pedicle length, the capacity for a chimeric muscle component from the medial gastrocnemius (MG), and low donor site morbidity. Previous work by Dusseldorp et al. classified MSAP vascular anatomy according to the arterial branching pattern and height (Type I: single branch, Type IIa: dual branching pattern with take-off above tibial plateau, Type IIb: dual branching pattern with take-off below tibial plateau, Type III: 3 or more branches). This study hopes to delineate MSAP flap vascular anatomical branching characteristics and underscore the importance of pre-operative computed tomography angiogram (CTA) imaging in perforator selection.

Methodology: A retrospective analysis was conducted of all patients who had underwent CTA imaging for use in head and neck reconstructive surgery at our institution between 2016-2021. MSAP branching patterns were classified according to Dusseldorp et al. (2014). Additional data was collected on visibility of MSAPs on Maximum Intensity Projection (MIP) reformats, dominance of MSA branches, and vessel depth at the widest portion of the MD. Statistical analyses included Pearson's chi-squared test for comparing branching pattern and dominant branch type between Type IIA & Type IIB, and Kruskall-Wallis tests for the association between branching pattern and perforator depth at the widest part of the MG.

Results: A total of 83 patients and 166 potential lower extremity scans met inclusion criteria. From this initial cohort, 13 scans were excluded due to missing CTA scans or radiologic artifact from knee replacements (7.8%), with final inclusion of 153 scans. Type IIA branching type was the most prevalent (41.3%), followed by Type III (17.4%), Type IIB (15.6%), and Type I (15.0%)**.** There were 4 "not further classified" (NFC) scans (2.4%) that did not fit any criteria. Overall, branch dominance was observed in 66% of cases, with the lateral-most MSA branch most frequently dominant (61%) compared to the medial (28%) and middle (11%) branches. The average MSAP depth at the widest part of the MG was 8.8 millimeters (mm), which was similar across branching patterns: Type I (8.5 mm), Type IIA (8.5 mm), Type IIB (8.7 mm), Type III (9.9 mm), and NFC (9.3 mm). Perforators were appreciated in 51% of MIP scans. Pearson's chi-squared test demonstrated p-value of 0.0015 at $\alpha < 0.05$. Kruskall-Wallis tests showed a p-value of <0.0001 at $\alpha < 0.05$.

Discussion: Lower extremity CTA provides useful information that may facilitate MSAP flap harvest. The Type IIA branching pattern was the most common. The lateral MSA branch was most often dominant. There appears to be a relationship between distribution of dominant branch and branching pattern type between the Type IIA & Type IIB groups, with the former favoring lateral branch dominance and the latter favoring medial branch dominance. There was also significance demonstrated between branching pattern and average MSAP branch depth at the widest part of MG, which may suggest that certain branching morphologies may be favorable for perforator access.

(46) Characterization of Upper Extremity versus Lower Extremity Injuries in Pediatric Gunshot Victims in a Level 1 Trauma Center

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Introduction: Pediatric gunshot wounds (GSWs) have seen a steady increase in incidence over the past several decades, overtaking motor vehicle accidents as the leading cause of death in children in 2020.[1-3] While extremity injuries represent the most common site of nonfatal GSW injuries in children, studies indicate that lower extremity (LE) wounds occur more frequently than upper extremity (UE) injuries, though both types can result in severe complications. These injuries result in significant financial burden and complications including compartment syndrome, fractures, vascular injuries, and long-term orthopedic problems.[4-6] Currently, there are limited studies analyzing the epidemiological characteristics and management of extremity injuries.[7] This study aims to investigate these aspects of both UE and LE gunshot injuries seen in a major metropolitan area over the past 14 years, with the goal of improving current treatment guidelines and patient outcomes.

Methodology: An IRB-approved retrospective review was conducted on all patients under 18 years old who presented to a Level 1 trauma center in a large metropolitan area in the Southwest between March 2010 and March 2024 with the primary diagnosis of a gunshot wound, determined by ICD-10 coding and/or Billing Code 20103. Patient data was reviewed and recorded in a secure spreadsheet, analyzing UE and LE injurie's context, management and outcome. Univariate analysis was conducted to quantify descriptive data.

Results: A total of 246 pediatric patients sustained extremity GSWs, with 94 (38.21%) involving the UE and 152 (61.79%) involving the LE. The most injured structure was soft tissue (upper: 81, 86.17%; lower: 116, 76.32%), followed by bone (upper: 60, 63.83%; lower: 56, 36.84%), nerves (upper: 33, 35.11%; lower: 11, 7.24%), and vasculature (upper: 20, 21.28%; lower: 18, 11.84%). Surgery was required in 62 (65.96%) UE injuries and 64 (42.11%) LE injuries. Nonoperative management was used in 24 (25.53%) UE and 43 (28.29%) LE injuries. Antibiotic use was higher in UE injuries (90.43%) than in LE injuries (78.95%). Stabilization was required in 54 (57.45%) UE injuries and 52 (34.21%) LE injuries. Casting was the most common method (upper: 28.72%, lower: 19.74%), followed by surgical fixation. The average hospital stay was longer for UE injuries (4.39 days) than LE injuries (3.40 days). Readmission (upper: 4.26%, lower: 5.26%) and reoperation rates (upper: 10.64%, lower: 9.21%) were similar, while complications were more frequent in LE injuries (7.24%) than UE injuries (5.32%).

Conclusion: Firearm injuries in children is a national public health risk combined with the high prevalence of extremity injuries calls for knowledge of presentation and management. The majority of these patients with both UE and LE injuries required surgical intervention and antibiotics. UE GSW's had increased incidents of nerve-related injuries which were surprisingly due to self-inflicted injuries followed closely by assault. Further investigation into the long-term complications of both UE and LE injuries is required to better optimize management for better health outcomes.

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(47) Isolated Left Subclavian Artery with Patent Ductus Arteriosus in a Neonate

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Introduction: Normal aortic arch development is a complex process that is prone to congenital anomalies. A left aortic arch with a descending thoracic aorta is observed in approximately 70% of individuals. Isolation of the left subclavian artery is the least common aortic arch anomaly, in which the left subclavian artery no longer communicates with the aorta but is instead connected to the left pulmonary artery via the ductus arteriosus. We present a rare case of an isolated left subclavian artery that maintained communication with the left pulmonary artery through a patent ductus arteriosus (PDA) in a neonate.

Case Presentation: A neonate was born with dysmorphic facial features and significant feeding difficulties, including choking and wheezing, raising concerns for a possible airway abnormality. Initial imaging revealed cardiomegaly, and the patient was admitted to the neonatal intensive care unit. The patient also experienced hypoglycemia, which was managed with glucose gel.

Radiologic and Echocardiographic Findings: Cardiac CT demonstrated an isolated left subclavian artery arising from a left-sided PDA, a right-sided PDA with a ductal diverticulum, and no evidence of a vascular ring or tracheal narrowing. Echocardiography showed a large PDA aneurysm with left-to-right shunting, two ventricular septal defects (VSDs), a right aortic arch with an aberrant left subclavian artery, fenestrated secundum atrial septal defect (ASD), pulmonary stenosis, and right atrial and ventricular enlargement.

Feeding and Airway Evaluation: Initially, the patient tolerated full feeds of expressed breast milk (EBM) via gavage. However, aspiration with all liquid consistencies was observed on a swallowing evaluation, leading to an NPO recommendation. A laryngoscopic-directed flexible bronchoscopy and nasopharyngoscopy revealed swollen arytenoids without prolapse, a normal larynx, and patent nasal cavities.

Genetic Findings: Genetic testing identified a deletion of the EFTUD2 gene, consistent with mandibulofacial dysostosis with microcephaly and hearing loss.

Clinical Course: By age four months, the patient was tolerating feeds and gaining weight appropriately. At seven months, the patient measured 49.5 cm in height and weighed 3.45 kg, requiring ongoing nutritional support via a nasogastric tube with EBM and infant formula.

Clinical Impact/Relevance: This case underscores the importance of early identification and multidisciplinary management of congenital cardiovascular anomalies. The isolated left subclavian artery with a left-sided PDA, while not requiring immediate surgical intervention, necessitated careful monitoring due to potential complications such as laryngeal constriction, steal syndrome, and pulmonary vascular resistance changes. The presence of EFTUD2 gene deletion further complicates management, requiring genetic counseling and long-term follow-up.

Discussion: This case highlights the challenges of diagnosing and managing congenital heart anomalies in neonates, particularly when compounded by airway concerns, feeding difficulties, and genetic syndromes. Close follow-up is essential to monitor for hemodynamic changes that may necessitate future PDA closure. The presence of EFTUD2 deletion suggests a syndromic association, reinforcing the need for a comprehensive, multidisciplinary approach.

Conclusion: This neonate presented with an exceedingly rare congenital vascular anomaly, requiring intensive care, specialized feeding support, and ongoing cardiology follow-up. Early diagnosis and a coordinated care plan remain essential for optimizing outcomes in neonates with complex congenital heart disease.

(48) Retrospectively Comparing Parathyroid Carcinoma and Atypical Parathyroid Tumor: A 24-Year Experience

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Introduction: Parathyroid carcinoma (PC) and atypical parathyroid tumors (aPT) exhibit similar presentations. Since the recent WHO classification of aPT, only a single study has attempted to delineate their differences. Our study aims to expand existing data and identify new distinctions not previously reported in the literature.

Methods: Twelve patients were identified-seven with PC and five with aPT. Clinical symptoms and objective data were collected. Comparative analyses were performed between the groups.

Results: Patients with aPT were significantly older, averaging 64.6 years versus 43.6 years (p = 0.03). A higher prevalence of females was noted in both groups. Psychiatric symptoms were more commonly observed in aPT patients (75% vs. 14%; p = 0.04). PC patients presented with higher albumin (4.62 g/dL vs. 4.05 g/dL, p = 0.001) and lower inactive vitamin D levels (8.66 ng/mL vs. 15.58 ng/mL; p = 0.01). Histopathologically, PC had increased mitotic activity (100% vs. 40%; p = 0.02) and more frequent Ki-67 labeling (71% vs. 0%; p = 0.01). Recurrences (71% vs. 0%; p = 0.02) and postoperative complications (86% vs. 0%; p = 0.01) were significantly more frequent in PC patients.

Discussion: PC and aPT exhibit substantial similarities across clinical and pathological features. Our study confirms these known similarities but also elucidates novel distinctions. The predominance of psychiatric symptoms may suggest aPT. Albumin and vitamin D level variations can aid in diagnosing and should be studied further. Increased mitotic activity and Ki-67 labeling are valuable for pathologists in challenging diagnoses.

Clinical Symptoms	PC, n (%)	aPT, n (%)	P-value
Abdominal symptoms	3 (43)	1 (25)	0.82
Bone pain	5 (71)	2 (25)	0.48
Dysphagia	1 (14)	1 (25)	0.66
Fatigue	3 (43)	3 (75)	0.20
Kidney stones	2 (29)	0 (0.0)	0.24
Muscle weakness	1 (14)	2 (50)	0.30
Palpable neck mass	4 (57)	1 (25)	0.30
Polydipsia	3 (43)	1 (25)	0.82
Polyuria	3 (43)	1 (25)	0.82
Psychiatric symptoms	1 (14)	3 (75)	0.04**
Weight loss	2 (29)	0 (0.0)	0.24
Incidental	1 (14)	0 (0.0)	0.82

This dataset did not include symptoms related to recurrences or postoperative monitoring. If a single patient reported multiple symptoms within the same category, they were counted as a single entry. Abdominal symptoms were defined as pain, constipation, pancreatitis, dyspepsia, or acid reflux. Psychiatric symptoms were defined as changes in memory, concentration, anxiety, mood symptoms, or psychotic symptoms. One patient was clinically asymptomatic and incidentally diagnosed with PC following a car accident.

Figure 1. Clinical symptoms at initial presentation in patients with parathyroid carcinoma and atypical parathyroid rumor.

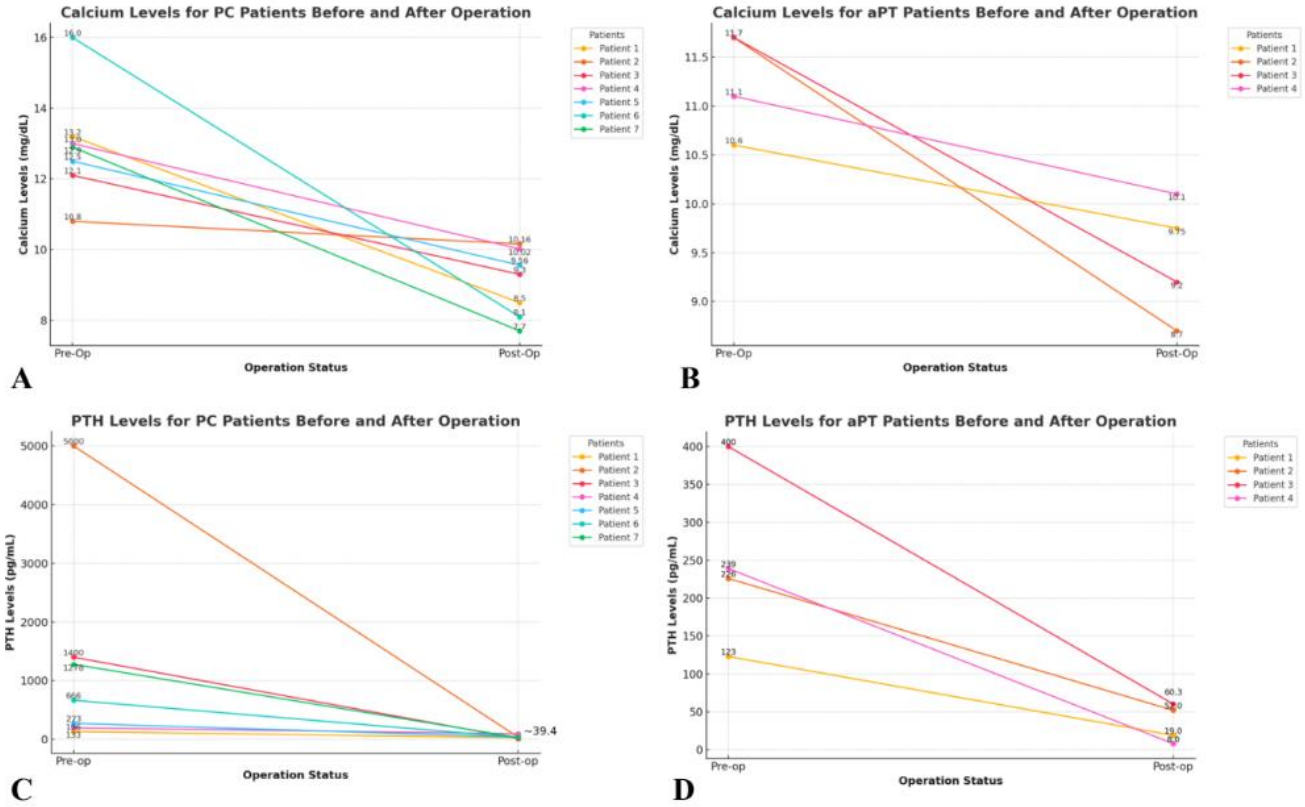

Figure 2. Figures 1A-D. Calcium and parathyroid hormone levels for every patient with parathyroid carcinoma and atypical parathyroid tumor before and after surgery.

(49) Characterization of Orthopedic Injuries in Pediatric Gunshot Victims at a Level 1 Trauma Center

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Introduction: Gunshot injuries are a leading cause of death among children in the United States. These injuries result in significant mortality, long-term disability, and healthcare expenses that amount to hundreds of millions annually. Despite the increasing rates of pediatrics gunshot injuries, there is limited focus on pediatric orthopedic gunshot injuries, their management, and resulting complications. This study aims to characterize orthopedic injury patterns and clinical interventions in pediatric gunshot victims over a 14-year period at a Level 1 Trauma Center.

Methodology: A retrospective IRB approved review was conducted to query all patients under 18 years old seen at a Level 1 Trauma Center in a large metropolitan area of the Southwest USA between March of 2010 and March of 2024. Inclusion criteria was defined as patients with the primary diagnosis of a gunshot wound as determined by ICD-10 coding related to gunshot wounds and/or Billing Code 20103. Patients with gunshot wounds resulting in orthopedic injury were identified, and information pertaining to injury patterns, management, and outcomes were extracted. These results were categorized following AO/OTA Fracture Classification.

Results: Of 499 total pediatric gunshot wound (GSW) patients, 166 had orthopedic injuries (33.2%). Surgical intervention was required in 69.9% of orthopedic injury cases (n=116). 35.5% of patients had upper extremity injuries, specifically 39 patients with hand fractures (AO/OTA 7), (23.5%), 10 patients with humerus, clavicle, or scapula fractures (AO/OTA 1) (6.0%), and 10 patients with forearm fractures (AO/OTA 2) (6.0%). Lower extremity injuries involving the tibia/fibula (AO/OTA 4) were seen in 18 patients (10.8%), femur/patella fractures (AO/OTA 3) were seen in 16 patients (9.6%), and foot/toe fractures (AO/OTA 8) were seen in 15 patients (9.0%). 47 patients (28.3%) sustained skull, facial, or orbital fractures (AO/OTA 9). 11 patients had spinal fractures (AO/OTA 5) (6.6%), 9 patients had pelvic fractures (AO/OTA 6) (5.4%) and 8 patients had rib fractures (4.8%). Using the modified Clavien-Dindo-Sink classification, severe intervention-related complications occurred in skull and facial fractures (AO/OTA 9) and hand fractures (AO/OTA 7). Mortality was 4.2% (n=7), including 5 skull fractures (AO/OTA 9), 1 pelvic fracture (AO/OTA 6), and 1 rib/sternum fracture.

Discussion: Pediatric gunshot-related orthopedic injuries predominantly involved the upper extremities, closely followed by lower extremities. Mortality and complications were notably higher in axial skeletal injuries, particularly those affecting the skull. Orthopedic injuries from pediatric gunshot wounds pose significant challenges to healthcare providers. Identifying injury patterns and outcomes can guide clinical management, ultimately reducing the burden of these injuries.

*Epidemiological Characteristics of Pediatric Gunshot Injuries in a Level 1 Trauma Center in Arizona

(NOT PRESENTING LIVE TODAY)

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Introduction: Gunshot injuries became the leading cause of death in children in the United States in 2020 and have been linked with significant morbidity, mortality, and healthcare spending.[1-5] National and regional disparities across various epidemiological factors have previously been reported in pediatric gunshot-related injuries and deaths.[6-8] With existing differences between regions and no prior investigation in the Southwest[9], we sought to characterize pediatric gunshot injuries in a large metropolitan area in the Southwest across a range of factors including epidemiology, wound characteristics, and outcome measures.

Methodology: An IRB-approved retrospective review was performed involving all patients under 18 years old who presented to a Level 1 pediatric trauma center in a large metropolitan area in the Southwest from March 2010 to March 2024 with a primary diagnosis of a gunshot wound as determined by ICD-10 coding or Billing Code 20103. Patient records were reviewed, and relevant data was tabulated in a secure spreadsheet. Study population characteristics were calculated and stratified by 3-year intervals.

Results: A total of 499 pediatric gunshot wounds (GSWs) were identified and characterized as shown in Table 1. Incidence steadily rose from 2010-2012 (n=66) to 2022-2024 (n=140) with an increasing proportion of injuries occurring in the 12-17 age group (59.1% to 79.3% between the 2010-2012 and 2022-2024 time periods). Injuries predominantly occurred in males (395, 79.2%) and included a sizable Hispanic population (219, 43.9%). Average percentile according to State Area Deprivation Index (ADI) was 35.2, and most patients had AHCCCS for health insurance (345, 69.1%). Most GSWs occurred either in public spaces (30.1%) or at home (40.5%). GSWs were a mix of low-velocity (33.3%) and high-velocity (51.7%) bullets with a marked increase in high-velocity injuries in 2022-2024 (74.3%). The most common relationships with the shooter were: family member (17.6%), stranger (29.1%), and self (23.6%) with a marked increase in stranger-caused injuries in 2022-2024 (42.1%). From the ED, 20.4% went to the OR, 8.8% to the ICU, 34.5% to the floor/OBS, and 29.3% home. The highest proportion of injuries occurred in the head/neck area (33.7%) followed by lower extremities (23.4%), non-extremities (15.2%), and upper extremities (13.0%). The average length of stay was 23.1 (±12.6) days with an average mortality of 4.4%.

Conclusions: There has been an increase in pediatric gunshot injuries over the past 15 years with a more recent shift into the 12-17 age range. Certain population characteristics (male, hispanic, AHCCCS, lower socioeconomic status) may be linked with higher incidences. The identified results and trends can be useful in guiding local and national public health measures in addressing the pediatric gunshot injury crisis.

Significance/Take Home Message: Increasing incidence of pediatric gun violence poses an increasing burden on patients, families, healthcare systems, and the economy. Continued characterization can

reveal trends and associations that guide public health efforts and hospital-level management strategies.

Level of Evidence: Retrospective cohort study (Level III)

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*Machine Learning To Predict 30-day Readmissions After Cesarean Delivery: A 10-year Analysis

(NOT PRESENTING LIVE TODAY)

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Introduction: Cesarean section (C-section) is a common surgical procedure that increases the risk of postpartum hospital readmissions, particularly after complicated surgeries. We utilize machine learning (ML) to predict 30-day readmission following C-sections using a national database.

Methodology: From 2012-2022, the National Surgical Quality Improvement Project (NSQIP) database was polled, and demographic, pre-, and peri-operative data was collected, with 30-day readmission being the outcome. Random Forests (RF) and Extreme Gradient Boosting (XGBoost) ML models were developed and compared to logistic regression (LR).

Results: From 54,593 patients who underwent C-sections, 1306 had a readmission. Compared to the non-readmitted cohort, readmitted patients had higher rates of African American race (17.99% vs 9.83%), older mean age (31.44 vs 30.74 years), smoking (10.87% vs 8.67%), diabetes (11.03% vs 8.19%), hypertension (11.49% vs 4.68%), and longer operative times (57.42 vs 51.71 minutes) ($p<0.001$ for all). The RF and XGBoost models outperformed LR, demonstrating higher sensitivities (72.03% and 75.86% vs 49.43%, respectively) and area under the curve (AUC) (0.737 and 0.723 vs 0.722). A RF model with only pre-operative data was built and achieved a sensitivity of 83.14%. The strongest ML predictors of readmission were age, operative time, BMI, preoperative white blood cell counts, and hematocrit levels.

Conclusion: Machine learning can be used to identify patients at a high risk of readmission after C-section using only preoperative data. Ability to identify patients at risk can prompt possible interventions during initial admission or during follow up to prevent readmission, thus alleviating economic burdens on the healthcare system and ultimately improving outcomes.

*Referral patterns and adherence to pelvic floor physical therapy among women with dysfunctional voiding

(NOT PRESENTING LIVE TODAY!)

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Introduction: Dysfunctional voiding (DV) is a bladder outlet condition characterized by an intermittent or fluctuating urine flow rate due to impaired relaxation of the urethral sphincter or pelvic floor musculature. Pelvic floor physical therapy (PFPT) is a proven effective intervention for this condition, involving pelvic floor muscle training and biofeedback. Despite its effectiveness, the utilization and adherence rates of PFPT are not well-known.

Objective: Our study aims to determine the referral rate to PFPT among female patients with dysfunctional voiding at our institution and adherence to physical therapy treatments.

Methodology: We conducted a retrospective chart review of 62 female patients diagnosed with dysfunctional voiding from May 2021 through April 2023. After excluding patients with neurogenic bladder conditions, 47 patients remained in the study. The median age of participants was 61 years. Referral rates to PFPT, adherence to the therapy, and completion of the recommended sessions were analyzed. We also collected data on the number of PFPT sessions recommended by the therapists, and the number of sessions completed.

Results: Out of 47 patients, 28 (59.5%) were referred to PFPT. Among those referred, 19 (67.9%) pursued PFPT at our institution. Of those who pursued therapy, the median number of recommended sessions was 11, and the median number of sessions completed was 5.5. A total of 12 patients (63% of those who pursued therapy) completed the full PFPT as recommended, while 7 patients (36.8%) did not complete the full course.

Conclusion: About 60% of patients given the diagnosis of dysfunctional voiding were referred to PFPT, of which 70% of those pursued the therapy. Limitations include the retrospective nature of the study, and the lack of information from those that sought PFPT outside of our institution. Additionally, our study did not aim to evaluate the outcomes of those that did PFPT, which can be an area for future study. Further research, including patient surveys and focus groups, is warranted to identify and address barriers to obtaining care for this condition, which ultimately is crucial for improving outcomes in this patient population.

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