



Emerald Coast 2024 Abstracts

Research Abstract: 24-01

Title: D-Dimer Dynamics: Exploring Baseline Thresholds and Vital Sign Correlations Patterns in Pulmonary Embolism Diagnosis

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Additional Author(s): Mardan Khashimov BSc, College of Medicine; Payal Panchal BSc, College of Medicine; Katelyn Fields, BSc, College of Medicine; Will Cranford, BSc, MS, University of Kentucky College of Public Health, Department of Statistics; Kristen McQuerry, BA, MA, MSc, PhD, University of Kentucky College of Public Health, Department of Statistics; Sameer Desai, MD, University of Kentucky College of Medicine, Division of Emergency Medicine

Introduction/Background: The objective of our retrospective chart review was to investigate the correlation between D-dimer levels in patients admitted through the emergency department (ED) and their likelihood of having a pulmonary embolism (PE), as well as the severity of their presentation, quantified by vital signs collected at the time of entry. We hypothesized that higher D-dimer levels will be associated with an increased likelihood of PE and worse clinical presentations. By clarifying this relationship, we aim to provide valuable insights into the utility of D-dimer testing in the emergency department setting for identifying patients at risk for severe PE.

Methods: We looked at de-identified charts of patients aged 18-65 presenting to the ED, from January 1, 2020, to December 31, 2022, with a suspected PE, specific presenting symptoms (chest pain, cough, fever, unilateral leg swelling, surgery/trauma within the previous 4 weeks), and a D-dimer lab. Data was collected using the University of Kentucky Clinical and Translational Science (CCTS) resources and REDCap. We identified several variables of interest in patient charts: Baseline D-dimer level, heart rate and blood pressure at time of entry, and past diagnosis of PE or deep vein thrombosis (DVT).

Results: Low D-Dimer indicates a low predicted probability of a positive PE diagnosis. The Odds Ratio (OR) was 2.13 ($p < 0.001$), indicating that if a patient's D-dimer levels doubled, their odds of having a PE would increase by a multiple of 2.13 (8.4).

Adjusting for confounding variables, accuracy, sensitivity, and specificity increased to 78%, 82% and 81% respectively. The OR of having a PE based on D-Dimer when previous PE was taken into consideration was 11.2 ($p < 0.001$).

Adjusting for age and gender, systolic BP ($p=0.010$) and pulse pressure ($p=0.024$) were significant when multivariate linear regression was run.

Discussion and Conclusion: Adjusting for age and gender illustrated that higher D-dimer levels correlate with an increased likelihood of a PE diagnosis and that men are more likely to be PE+. While a statistically significant positive relationship was found, there were many patients with D-dimer levels below the average who were PE+. We also found that the likelihood to have a PE increases exponentially as D-dimer levels increase. Despite our original hypothesis, our data shows that only systolic BP and pulse pressure had a statistically significant difference in PE+ patients.



Emerald Coast 2024 Abstracts

Case Study Abstract: 24-02

Title: Thyroid storm resulting in severe left ventricular dysfunction requiring venoarterial extracorporeal membrane oxygenation

Presenting Author: Derek Martinez, PGY3, University of Oklahoma, Department of Emergency Medicine

Additional Author(s): Russel Anderson, DO¹; Jeffrey Goodloe, MD²; Eric Lee, MD³; Ashwin Adivi, DO⁴; Derek Martinez, DO⁵; Rachel Bright⁶; Raegan Tremblay⁷

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Introduction/Background: Hyperthyroidism is a pathologic state in which an excess of T3 and T4 are peripherally converted to their active hormone⁷. The active hormones can overstimulate gene transcription leading to the collective symptoms recognized as hyperthyroidism.¹ These symptoms include diaphoresis, tachycardia, heat intolerance, and altered mental status. Of patients with hyperthyroidism, 2% will develop thyroid storm.² Thyroid storm is usually triggered by a pathologic event resulting in increased catecholamines and catecholamine receptors sensitizing the body to the active hormones³. High output heart failure is a well-documented sequelae of thyroid storm^{4,7}. Thyroid storm can lead to heart failure in about 6% of patients but cardiomyopathy with left ventricular dysfunction only presents in about 1% of thyroid storm patients⁵.

Veno arterial extracorporeal membrane oxygenation (V-A ECMO) is a means of providing partial hemodynamic and full respiratory support to patients with cardiac and respiratory failure. Accessibility to V-A ECMO is still a limiting factor to its use^{6,7}. Currently there is limited but compelling evidence on the use of V-A ECMO as a bridge therapy to thyroidectomy⁷⁻⁹. From our review of the literature only a few case reports exist.

Description: A 56 year old male arrived via EMS with a chief complaint of palpitations. He was found to be in atrial fibrillation with rapid ventricular response with rates in the 200s. He was administered 10mg diltiazem pre-hospital with improvement in his rates to the 150s-180s on arrival. His review of systems was negative for antecedent fever, chills, congestion, nausea, vomiting, or abdominal pain. His blood pressure was 130/80, his heart rate was irregular in the 150s, his respirations were 16, and he was afebrile. His physical exam revealed clear lung sounds bilaterally with mild lower extremity pitting edema. He received additional doses of diltiazem and was started on an infusion without further improvement in his rates. His lab work then returned with BNP elevation at 820 pg/mL, d-dimer of 1.78 FEU, and an undetectably low TSH <0.003 uIU/mL. Diltiazem was then stopped and beta blockade was trialed with improved rate control in the 120s. He was admitted to the MICU for further management of potential thyroid storm. Formal TTE performed on admission demonstrated an EF of 10%. He was given PTU, hydrocortisone, iodine, and cholestyramine empirically. He rapidly decompensated after admission, requiring intubation and multiple vasopressors. The patient was then emergently cannulated for VA ECMO with impella placement. Following this, he was weaned off vasopressors rapidly with immediate improvement in perfusion. At the time of submission, patient was clinically progressing and had regained neurologic function.

Discussion and Conclusion: Thyroid storm is an exceedingly rare diagnosis in the emergency department. The patient was ultimately found to have severe left ventricular dysfunction, undetectable TSH levels, and circulatory collapse requiring V-A ECMO support. We highlight the role of V-A ECMO as a bridging therapy for patients who present in thyroid storm with cardiac dysfunction. To our knowledge there are very few case reports highlighting the role for ECMO in patients with thyroid storm although evidence shows that it can be beneficial. Thyroid storm with cardiovascular dysfunction presents in 1% of cases with extremely high mortality rates.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-03

Title: A Not so "Common Blister"

Presenting Author: Soterios Stroud, PGY2, University of South Alabama Emergency Medicine Residency

Additional Author(s): Michael L. Sternberg, MD, FACEP, FAAEM

Introduction/Background: Pemphigus Vulgaris is a rare cutaneous disease that is driven by an autoimmune process that results in blistering of the skin. Patients will present with painful mucosal ulcerations, intraepidermal blisters that are flaccid and fragile, and eroded skin. Diagnosis requires a perilesional biopsy. Etiologies can include a genetic predisposition and exposure to environmental triggers.

Description: 29-year-old Cambodian female with no past medical history presented to the ED with a painful, diffuse blistering skin rash that began 2 weeks prior. She began to develop the rash after starting sulfamethoxazole/trimethoprim to treat a breast abscess from her PCP. Despite discontinuing the sulfamethoxazole/trimethoprim, her rash continued to worsen. She denied any allergies or prior episodes. On physical exam, the patient had extensive blisters, erosions, crusts and denudation throughout the entire body, including the oral mucosa. Her vitals were normal. Consultation was made by phone with a dermatopathologist who recommended skin biopsies. Leading edge punch biopsies were obtained in the ED. Burn surgery was consulted for concern for Steven-Johnson syndrome and the patient was admitted to the inpatient medicine team. The biopsy results made available the next day revealed direct immunofluorescence staining for IgG and C3 to show intracellular staining. Histology showed tombstoning and bullous formation with separation of upper epidermis. These findings were diagnostic of pemphigus vulgaris. The patient was placed on corticosteroids and received a rituximab infusion while hospitalized. The patient was discharged on hospital day 6 with close follow up for another rituximab infusion. She was documented to have significant healing of her lesions without the formation of any new lesions at her follow up appointment.

Discussion and Conclusion: Pemphigus Vulgaris is an autoimmune blistering disease that is mediated by IgG autoantibodies directed against desmoglein 1 and desmoglein 3. The patient in this case developed blistering skin lesions after initiating sulfamethoxazole/trimethoprim. Diagnosis is made by direct immunofluorescence and histology of a tissue biopsy with or without serological testing. Emergency department management includes pain control, wound care for skin lesions, fluids, and corticosteroids. Definitive management is accomplished through remission induction with corticosteroids followed by remission maintenance with an immunosuppressant. Remission can be achieved in up to 90% of patients with current therapies. The patient in this case had an excellent outcome and achieved remission with early corticosteroids and rituximab therapy.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-04

Title: IgA Vasculitis: An Interesting Cause of Recurrent Acute Compartment Syndrome

Presenting Author: Mel Ebeling, MS3, University of Alabama at Birmingham Heersink School of Medicine

Additional Author(s): Blakeley Hudson, MD, Assistant Professor, Dept. of Emergency Medicine, University of Alabama at Birmingham Heersink School of Medicine

Introduction/Background: Acute compartment syndrome (ACS) is a surgical emergency requiring rapid recognition in the emergency department to minimize morbidity and mortality. Traumatic extremity fractures account for approximately 75% of cases, and the classical presentation of ACS is commonly remembered by the “6 P’s”: pain, paresthesias, poikilothermia, pallor, pulselessness, and paralysis [1,2]. Atraumatic ACS is substantially less common, with current evidence mostly limited to case reports, and diagnosis is made more challenging by the absence of obvious traumatic injury [3]. Here we present the case of recurrent, atraumatic ACS in a patient with IgA vasculitis, successfully managed with prompt fasciotomy.

Description: A 23-year-old female with IgA vasculitis and history of spontaneous intramuscular hemorrhage of the right lower leg leading to compartment syndrome requiring fasciotomies presented to the emergency department with a five-day course of progressively worsening left hand and lower leg pain and swelling, left hand ecchymosis, and left foot numbness. The left dorsalis pedis pulse was diminished, while the left radial pulse remained normal. The patient was admitted for concern for compartment syndrome and underwent a four-compartment fasciotomy of the left lower leg, which revealed edema in three of the four compartments and intramuscular hematomas in the anterior and superficial posterior compartments. She returned to the operating room two days later for washout, closure of the medial fasciotomy site wound, and partial closure of the lateral wound with wound VAC placement. Autograft to that lateral site was performed nine days after the initial fasciotomies. The patient's left hand was successfully treated with elevation and compression wrapping. She was discharged 20 days after her initial presentation.

Discussion and Conclusion: Spontaneous intramuscular hemorrhage is a rare sequela of IgA vasculitis, and to our knowledge, this is the first case of this leading to atraumatic ACS [4,5]. Endothelial damage and fibrinoid necrosis of the vessel walls secondary to immune complex deposition is thought to lead to hemorrhage [6]. We conclude that physicians should maintain a high index of suspicion for ACS in individuals with extremity pain and swelling even when traumatic injury is absent. More research is necessary to determine how ACS caused by underlying vasculitis occurs and can be prevented.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-05

Title: Case Report: Torsade's de Pointes Following Haloperidol Administration vs Management with Ketamine in the Emergency Department

Presenting Author: Ahmed Saeed, PGY1, University of Alabama at Birmingham Department of Emergency Medicine

Additional Author(s): Devon Wade, MD; William Miller, MD; Todd Peterson, MD, University of Alabama at Birmingham Department of Emergency Medicine

Introduction/Background: Haloperidol is a widely used antipsychotic for managing various psychiatric conditions, including agitation. However, its propensity to prolong the QT interval and precipitate Torsade's de Pointes raises concerns about its cardiac safety. We present a case where a patient developed TdP after haloperidol. Ketamine is explored as a safer alternative for agitation, gaining recognition for its benefits. Haloperidol has traditionally been used to manage agitation; ketamine is gaining recognition for its potential benefits. We will review the pharmacological properties of ketamine, its mechanism of action, and the existing evidence supporting its use as a safer and more effective alternative to haloperidol in the treatment of agitated patients.

Description: A 42-year-old female with bipolar disorder and substance abuse presented to the ED with severe agitation, psychosis, and aggressive behavior. Despite initial sedation with haloperidol, lorazepam, and benzotropine, escalating agitation led to additional midazolam doses. Subsequently, the patient deteriorated into pulseless arrest, necessitating ACLS interventions including cardioversion and magnesium administration. Electrophysiology was consulted given the patient's polymorphic ventricular tachycardia arrest in the setting of prolonged QTc. It also revealed that in the outpatient setting patient was on a Ondansetron, hydroxyzine, Trileptal, Seroquel, and lorazepam all of which can prolong QT intervals. The patient's ICU stay was complicated by agitation, pneumonia, and ARDS, requiring extensive management. Discharged after 33 days, this case underscores the complexities of managing agitation in psychiatric emergencies and highlights the critical need for tailored interventions.

Discussion and Conclusion: This case report underscores the critical need for emergency physicians to be acutely aware of the cardiac risks linked to haloperidol use, especially in high-risk patients. Clinicians must carefully balance the advantages and disadvantages of sedatives, particularly in cases of acute psychosis. Ketamine emerges as a potentially safer and more effective alternative, especially for patients without documented psychiatric histories or when obtaining an EKG is challenging. Its unique properties make it promising for managing agitation, especially in patients with complex medical backgrounds. However, individual patient factors must be carefully considered in treatment decisions. Further research and the development of clinical guidelines are necessary to establish the best practices for ketamine use in managing agitation in emergency psychiatry settings.

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Case Study Abstract: 24-06

Title: Massive Hemoptysis Due to Acute Mitral Regurgitation in a Previously Healthy Female: A Case Report

Presenting Author: Devon Wade, PGY-2, University of Alabama Birmingham Medical Center

Additional Author(s): Julie Brown MD, Associate Professor UAB Emergency Medicine

Introduction/Background: Hemoptysis is an uncommon but extremely high acuity presentation in the emergency department. Care must be taken to rapidly recognize severe massive hemoptysis versus more benign cases. It is estimated that 4.8-14% of patient's presenting with hemoptysis will have massive hemoptysis, which is typically defined as greater than 100 mL to 1000 mL of blood. Common causes of severe hemoptysis include lung cancer; metastatic disease; infectious causes such as bronchiectasis, lung abscess, tuberculosis, and endocarditis; cardiovascular causes such as congestive heart failure, pulmonary embolism, AV malformation, tracheoinnominate fistula, mitral valve stenosis, and ANCA associated vasculitis.⁸ Airway management is especially important in massive hemoptysis. Not all patients will require endotracheal intubation, however patients who are unable to expectorate blood, are in respiratory distress or become hypoxemic, will likely require intubation. This should be performed by the most experienced clinician.⁹ It is recommended to use a video device with a standard geometry blade that can be used for direct laryngoscopy should the camera become obscured. Two large bore suction devices should be available, and a large ET tube is preferred to facilitate bronchoscopy. If there is a focal site of bleeding, main stem intubation in the nonbleeding lung may be preferable to facilitate oxygenation and protect the unaffected lung.⁹ Patients with massive hemoptysis usually require ICU level of care.

Description: 38-year-old female with history of hypertension presents to the emergency department with acute onset hemoptysis and shortness of breath. Patient states that the night prior, she began having small amounts of bright red blood in her cough which progressively worsened. While in the waiting room, the patient went to the bathroom and began having massive hemoptysis. Patient was rushed to the first available room where her evaluation began. On arrival, patient was tachycardic and hypertensive with systolic blood pressure in the 170-180s. The patient was in obvious respiratory distress but was maintaining an O₂ saturation greater than 90% on room air.

The patient's physical exam was notable for diminished breath sounds in the bilateral lung fields with crackles in the bilateral bases. Given the patient's acute onset massive hemoptysis, the decision was made to intubate for airway protection and eventual bronchoscopy. Nebulized TXA was given during preoxygenation.

Postintubation chest film showed bilateral infrahilar opacities with pulmonary edema, but no laterality to the opacities in her lungs. CT angiography was negative for pulmonary embolus. Labs and coagulation studies in the emergency department were notable only for an elevated BNP to 400. Point-of-care ultrasound in the emergency department was notable for hyperdynamic left ventricle and color-flow Doppler noted severe mitral regurgitation with dilation of the left atrium. The patient was admitted to the medical ICU for further management.

Formal TEE performed 1 week later was notable for thickened mitral valve leaflets and severe mitral regurgitation which could be consistent with rheumatic valve disease. Cardiovascular surgery was consulted who performed a mechanical mitral valve replacement the next day. The patient tolerated the procedure well and was able to be weaned from afterload reducing medications. The patient was then started on warfarin for anticoagulation given her mechanical mitral valve. The patient was discharged home 18 days after initial presentation and continues to follow-up in the outpatient setting with cardiovascular surgery.

Discussion and Conclusion: We present a case of massive hemoptysis in a 38-year-old female caused by acute mitral regurgitation. This is a rare but life-threatening cause of massive hemoptysis which can easily be missed. Patient underwent initial stabilization and endotracheal intubation in the emergency department before being transferred to the ICU for afterload reduction and eventual mitral valve replacement by CV surgery. Patient is currently doing well at her outpatient follow-up appointments. This case serves as a reminder of the broad differential for hemoptysis and importance of prompt and aggressive airway management in this patient population.

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Case Study Abstract: 24-07

Title: Severe Serotonin Syndrome from Presumed Fluoxetine and Lamotrigine Ingestion

Presenting Author: Sally Passons, PGY1, UAB

Additional Author(s): Katherine Griesmer PGY3, William F Rushton (EM/Tox Attending)

Introduction/Background: With the increasing focus on mental health, the number of antidepressants prescribed has increased. Selective serotonin reuptake inhibitors (SSRIs) are one of the first classes to be prescribed.¹ While having a relatively well tolerated side effect profile, there are multiple medications that may interact, increasing the risk of serotonin syndrome.

Description: A 17-year-old female with history of depression, anxiety, and juvenile myoclonic epilepsy with previous suicide attempt presented to the Pediatric Intensive Care Unit (PICU) from another facility with concern for status epilepticus. She was found near her medications (lamotrigine and hydroxyzine) with father noting presumed myoclonic jerks. Her fluoxetine prescription was monitored in a locked space. Patient remained altered with the outside ED becoming concerned for status epilepticus. Patient received loading doses of levetiracetam and phenobarbital with midazolam, lorazepam, and propofol and intubation for airway protection. On arrival to PICU, she had infinite clonus, disconjugate gaze, tachycardia, hyperthermia, and hypertension. ECGs displayed QTc prolongation. She required intermittent propofol and dexmedetomidine drips to assist with treating serotonin syndrome. She remained intubated for six days from prolonged serotonin syndrome. Following extubation, patient stated she intentionally ingested extra doses of lamotrigine in a suicide attempt.

Discussion and Conclusion: Serotonin syndrome requires high clinical suspicion and thorough history and physical exam to diagnose. It remains difficult to diagnose and may be missed frequently as there is no single diagnostic test.² For our patient, multiple factors were contributing to her clinical picture. Lamotrigine's anticonvulsant and mood stabilizer potential is due to its multiple mechanisms of action: blockage of voltage gated sodium channels, thus blocking glutamate release, increases the release of gamma aminobutyric acid (GABA), and inhibits the uptake of serotonin. Previously, lamotrigine has been seen to cause serotonin syndrome particularly with other serotonergic drugs given its mechanism of action.³ Our patient was prescribed fluoxetine, the SSRI with the longest half-life, exacerbating her situation.

As we continue to focus more efforts on mental health treatment, the incidence of SSRI prescriptions may increase. Combined with the multitude of medications that also work in a serotonergic manner, serotonin syndrome will need to remain on the differential.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-08

Title: An Uninvited Guest on the Mind

Presenting Author: Mark Azmy, PGY1, University of South Alabama Emergency Medicine Residency

Additional Author(s): Javier Michael, MS3; Michael L. Sternberg, MD, FACEP, FAAEM, Professor of Department of Emergency Medicine

Introduction/Background: Neurocysticercosis (NCC) is the most common parasitic infection of the central nervous system worldwide, and is endemic in regions with poor sanitary conditions. NCC can have a variety of clinical presentations that mimic many different pathologies. It typically will require detailed history gathering and deliberate testing to diagnose. Diagnosis is usually made with a combination of neuroimaging modalities, serology, and histopathology.

Description: 31 year old male with PMH of HTN and CKD II presented to the ED for possible seizure-like activity. The patient endorsed 2-3 weeks of neck pain preceding an unwitnessed episode of involuntary neck movements and loss of consciousness prior to arrival. Pt denied any urinary incontinence, biting of the tongue, headache, nausea/vomiting, fevers, or cognitive changes. Physical exam was unremarkable and vitals were remarkable for hypertension. CT imaging revealed a right frontal lobe mass with vasogenic edema and MRI showed a rim enhancing cystic lesion with central calcification. The patient was admitted to the ICU with neurosurgical consultation and subsequently underwent craniotomy with complete resection of the lesion. Intraoperative pathology was concerning for toxoplasmosis versus NCC. Post surgical outpatient follow-up CT showed no residual mass. Serology for toxoplasmosis, echinococcus, cryptococcus, cysticercosis, quantiferon TB gold, and HIV panels were negative. Histopathology identified degenerating larvae consistent with NCC. The patient was discharged home to complete 14 days of albendazole with close follow up.

Discussion and Conclusion: NCC is an uncommon presentation within the United States, but its incidence has risen due to increases in travel and immigration. The clinical picture for NCC can vary widely, with symptoms such as headache, seizures, focal deficits, intracranial hypertension, and cognitive changes. The patient in this case presented with neck pain and seizure-like activity. Emergency department management includes early treatment of seizures and intracranial hypertension. Definitive diagnosis is made with visualization of a scolex on neuroimaging, or with histopathology and neuroimaging without a scolex, while serology aids in confirming the diagnosis. Definitive management consists of antiparasitic treatment with steroids to control the inflammatory response. Surgical intervention may be necessary to relieve obstructive cysts causing hydrocephalus, seizures, or intracranial hypertension.

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Emerald Coast 2024 Abstracts

Cast Study Abstract: 24-09

Title: NECK-rotizing Fasciitis

Presenting Author: Madison Williams Chen, PGY1, University of Alabama Birmingham

Additional Author(s): Adam J Hoesley, BS, MS3, UAB; Katherine Griesmer, MD, PGY3, UAB; Erin F. Shufflebarger, MD, MSPH, Assistant Professor, UAB; Landry Hadderton, MD, PGY3, UAB; Zachary Pacheco, MD, Assistant Professor, UAB

Description: A 46-year-old male presented to the emergency department with the chief complaint of “neck swelling.” His exam was notable for extensive erythema and edema of the anterior neck extending from the angle of the mandible to the suprasternal notch (Figures 1, 2). He was tachycardic and hypoxic on arrival though in no acute respiratory distress and his oxygen saturation improved with supplemental oxygen. Point-of-care ultrasound (POCUS) was performed (Figure 3) and subsequent computed tomography of the neck was obtained (Figure 4). Lab work was notable for blood glucose of 600 mg/dL, lactic acid of 6.3 mmol/L and leukocytosis of 22.82 10³/cm.

Discussion and Conclusion: This case describes necrotizing fasciitis (NF). NF is a life-threatening bacterial infection of deep soft tissues that causes rapidly progressive destruction of muscle fascia and subcutaneous fat (Chen, et al). Early diagnosis and urgent surgical intervention has been shown to reduce morbidity and mortality, the latter ranging up to 36% (Paz Maya, et al and Khamnuan, et al). The condition presents more frequently in patients with diabetes, immunosuppression, and substance use disorders (Green, et al). Early recognition is a diagnostic challenge given the scarcity of pathognomonic findings, leading to common misdiagnoses such as cellulitis and abscess (Goh, et al). Patients with NF can present with superficial findings limited to skin erythema and edema (Chen et al). POCUS can be a useful tool in evaluation of these patients as it can quickly identify features of NF, such as subcutaneous emphysema, as well as rule out common misdiagnoses (Salati, et al and Paz Maya, et al). The diagnosis is definitively made through surgical intervention, which is the mainstay of treatment along with aggressive antibiotic therapy (Bonne, et al). This patient was started on broad-spectrum antibiotics, including vancomycin, clindamycin, and cefepime, and taken emergently to the operating room by Otolaryngology.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-10

Title: Man with Forehead Swelling

Presenting Author: Madison Williams Chen, PGY1, University of Alabama Birmingham

Additional Author(s): Sally Passons, MD, PGY1, UAB; Samuel L Burleson, MD, Fellowship Director of Point-of-care Ultrasound in Resource-Limited Settings and Assistant Professor in the Department of Emergency Medicine, UAB; David Pigott, MD, Professor in the Department of Emergency Medicine, UAB

Description: A 60-year-old male presented to the emergency department with the complaint of sinus infection and facial swelling. The patient endorsed worsening symptoms for one month including nasal congestion, bloody nasal drainage, facial swelling and pain, and new onset diplopia. Examination was notable for forehead swelling extending to the periorbital area bilaterally (Figure 1). Point-of-care ultrasound was performed (Figures 2-4) and identified a heterogeneous, highly vascular soft tissue mass with associated erosion of the frontal bone. Computed tomography of the head and maxillofacial structures was then obtained (Figures 5-8), confirming the diagnosis of a large, anterior soft tissue mass with destruction of the frontal bone and mass effect on the orbits.

Discussion and Conclusion: The patient underwent endoscopic biopsy demonstrating squamous cell carcinoma originating from the skull base. In patients presenting with forehead swelling, point-of-care ultrasound (POCUS) provides a rapid imaging modality for superficial soft tissue masses (Aparisi Gomez, et al and Catalano, et al). Given the broad differential for this presentation, POCUS can facilitate the evaluation of skin and soft tissue infections, soft tissue, bony or vascular pathology. Importantly, the use of Doppler ultrasound can prevent inadvertent incision of occult vascular structures (Blaivas, et al). POCUS has aided the diagnosis of Pott's puffy tumor, a rare disorder which may present with forehead swelling due to an underlying abscess associated with frontal bone osteomyelitis (Acuña, et al). In evaluation of forehead masses, ultrasound can expedite further investigation by providing characterization of substance, vascularity, and compressibility (Kim, et al). POCUS examination in this patient rapidly facilitated appropriate additional imaging, consultation and diagnosis.

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Emerald Coast 2024 Abstracts

Research Abstract: 24-11

Title: GUARD Protocol

Presenting Author: Brandon Buchel, PGY4 Ultrasound Fellow, University of South Florida

Additional Author(s): Charlotte Derr, MD, Professor USF Residency Program Director Ultrasound Program Director; Allyson Hansen, DO, Residency Ultrasound Director

Introduction/Background: POCUS can be highly beneficial in screening ED patients taking GLP-1 receptor agonists (semaglutide) who might be at risk of aspiration during procedural sedation. Semaglutide, a commonly prescribed medication for diabetic patients, also aids in weight loss via delayed gastric emptying. Due to reports of patients aspirating gastric contents while under anesthesia, the American Society of Anesthesiologists now recommends patients to stop taking semaglutide up to a week before surgery due to the delayed gastric emptying side effect. Consequently, the ASA suggests employing POCUS to assess the volume and content of gastric contents before any procedural sedation.

Description: GLP-1 receptor agonists have increased in use particularly in the bariatric and weight loss world. More and more of our patients are on these medications, but not only for diabetes. These medications have shown to have weight loss effects through varying mechanisms. One important effect of this medication is delayed gastric emptying which in the early administration of long acting injectables, is quite profound but seems to improve after 12-20 weeks of use (1). This may not be true in the short acting, once daily oral medications (2).

Recently there has also been alarm in the anesthesiology community as small studies have been published associating use of GLP-1 receptor agonists with high residual gastric volumes in those reported as fasting as well as case studies showing aspiration occurrences in this population during anesthesia (2,3,4,5,6,7). Gastric US has shown to be a reliable predictor of gastric volume assessment preoperatively and it is easy to perform (8,9,10, 11, 12, 13, 14). Gastric US is performed in 3 easy steps (see figure).

Current best practice: ACEP Clinical Policy Procedural Sedation and Analgesia states: Do not delay procedural sedation in adults or pediatrics in the ED based on fasting time. Pre-procedural fasting for any duration has not demonstrated a reduction in the risk of emesis or aspiration when administering procedural sedation and analgesia. Considering these recommendations, the rapidity in growth and utilization of GLP-1 receptor agonists and data lacking in terms of pulmonary aspiration in this population taking these meds we should be revisiting pre-procedural sedation evaluations and focusing our efforts on this population.

Although there is a paucity of literature surrounding the incidence of aspiration during emergency airway procedures and moderate sedation, we believe prophylactic safety measures should be undertaken while research is being done. The continued utilization of risk stratification tools as well as considering the addition of gastric US for the population on GLP-1 receptor agonists (who can often be high risk for aspiration or difficult airways) is something to keep in our tool box at the bedside to make better informed decisions.

Discussion and Conclusion: Current practice, as aforementioned, recommended by ACEP is to not delay procedural sedation in adults or pediatrics based on fasting times. But with the higher utilization of GLP-1 agonists for weight loss and the concerns and different recommendations from our anesthesia colleagues

out of the ASA, we feel emergency medicine physicians and practitioners should be fully aware and equipped to better evaluate and manage this particular patient population prior to sedation.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-12

Title: "I get hoarse when I raise my arm!"

Presenting Author: Cinnamin Cross, MS-3, University of South Alabama College of Medicine

Additional Author(s): Michael L. Sternberg, MD, FACEP, FAAEM, Professor, Department of Emergency Medicine

Introduction/Background: Follicular adenoma is a benign thyroid tumor composed of follicular cells, often asymptomatic but can manifest as thyroid enlargement or compression symptoms like dysphagia and dyspnea. Diagnosis involves ultrasound, FNA w/ biopsy, and often lobectomy to distinguish it from follicular carcinoma. Etiologies include genetic predisposition, iodine deficiency, and radiation exposure.

Description: 46-year-old female with a history of thyroid goiter and tobacco use presented with increasing neck pain, swelling, new onset hoarseness when raising her left arm, pain w/ inspiration and dysphagia 1-day post-FNA. Symptoms had been progressing for 2 years. Vitals were unremarkable and physical exam was notable for left-sided neck swelling that was exquisitely tender to palpation along with hoarse voice, especially when raising the left arm. CT neck with contrast revealed a large left thyroid mass causing tracheal deviation. Symptoms were managed in the ED with IV fentanyl and ice pack. Patient was discharged for outpatient follow-up after consultation with endocrinology and surgical oncology. She later underwent left lobe thyroidectomy, confirming follicular adenoma.

Discussion and Conclusion: Follicular adenoma is a benign thyroid tumor with encapsulated nodules due to cell growth dysregulation. The patient in this case developed worsening unilateral neck pain, swelling, and new onset hoarseness and pain with inspiration post FNA. Diagnosis involves ultrasound, FNA, and imaging like CT or MRI in cases of suspected airway compromise. Distinguishing adenoma from carcinoma is challenging solely based on cytologic, sonographic, or clinical features. Therefore it often requires diagnostic lobectomy in suspected cases to rule out carcinoma. Follicular carcinoma carries a poor prognosis and requires prompt diagnosis. Emergency management focuses on symptom relief and ensuring airway patency, with follow-up care coordinated with specialists. Otolaryngology or surgical consultation may be necessary in cases of airway compromise.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-13

Title: Tension Pneumocephalus as a Cause of Focal Neurologic Deficit in a Geriatric Trauma Patient

Presenting Author: Mackenzie Link, PGY2, University of South Alabama

Additional Author(s): Richard Garri MD, Associate Residency Program Director University of South Alabama

Introduction/Background: Tension pneumocephalus is a rare neurosurgical emergency following head and maxillofacial trauma. It requires prompt recognition and treatment to prevent herniation and death.

Description: A 90-year-old female presented to the ED following an unwitnessed ground level fall at a nursing home. Vital signs were normal. Exam showed a right forehead hematoma. GCS was 13 with orientation only to self. Non-contrast head and maxillofacial CTs showed pneumocephalus without acute intracranial hemorrhage, a non-displaced fracture through the right frontal sinus and a non-displaced right greater sphenoid wing fracture extending into the sphenoid sinus. Nine hours after admission the patient became non-verbal, developed a left sided facial droop, left arm weakness, and her GCS declined to 8. Repeat head CT showed increased pneumocephalus with an 8.4mm midline shift consistent with tension pneumocephalus. A goals of care discussion was initiated with the patient's family. Due to the patient's prior wishes and poor prognosis, the patient was managed non-operatively. She was transferred to hospice care the next day.

Discussion and Conclusion: Tension pneumocephalus is an uncommon, life-threatening cause of increased intracranial pressure (ICP). The disease presentation mimics common causes of elevated ICP such as intracranial hemorrhages or strokes. The most common causes of tension pneumocephalus are fractures of the sinuses and skull base. Fractures cause dural tears that function as a ball valve and trap air inside the cranium. Alternatively, the "inverted soda bottle effect" postulates that a large CSF leak can cause sufficient negative pressure to draw air into the skull. Trapped air raises ICP, causing compression of intracranial structures leading to herniation and death if untreated. Tension pneumocephalus is diagnosed by non-contrast head CT. The pathognomonic CT finding is parting of the frontal lobes called the "Mount Fuji" sign. This patient's tension pneumocephalus is caused by her frontal and sphenoid sinus fractures via a ball valve mechanism. Her stroke-like presentation is typical for this disease process. Patients with tension pneumocephalus require prompt neurosurgical consultation for evaluation and surgical decompression. In this case, management was adjusted based on the patient's wishes and poor prognosis for recovery.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-14

Title: Azithromycin-Induced Linear Ig-A Bullous Dermatitis: A Case Report

Presenting Author: Jessica Behrnt, PGY2, University of Alabama Birmingham

Additional Author(s): Joel Evans, DO, UAB Emergency Medicine faculty

Introduction/Background: Linear Ig-A Bullous Dermatitis (LABD) is a very rare dermatological condition that can present a diagnostic challenge. It has several characteristics that mimic other drug eruptions and is often misdiagnosed on initial presentation.

Description: A 46-year-old male with a history of hypertension presents to the ED for an evaluation of a painful blistering rash. Approximately 10 days prior, the patient developed a dry cough and congestion, so he began taking a friend's Azithromycin. Two days later, he developed small painful blisters on his left arm that gradually spread, eventually covering his proximal limbs and abdomen. He also developed small areas of blistering on his lip and roof of his mouth. He was seen at an outside hospital, diagnosed with SJS, and discharged with a five-day course of prednisone. He presented again to the ED a few days later due to worsening of the rash, was given pain medication, and discharged. The rash still continued to spread, so the patient sought medical care a third time. This time, the blisters covered approximately 15% TBSA and he had subjective fevers, chills, and increased difficulty with eating. Dermatology was consulted and the patient was admitted to an inpatient unit. Skin biopsy was performed that revealed linear IgA deposits at the dermoepidermal junction, diagnostic of linear IgA bullous dermatitis. The patient was initially started on systemic steroids but ultimately required treatment with a course of dapsone. He was discharged 15 days later.

Discussion and Conclusion: The incidence of linear-IgA bullous dermatitis ranges from 0.5 to 2.3 cases per million people per year. This case represents one of only two other reported accounts of Azithromycin-induced LABD. Furthermore, it is unique in that LABD is seen in children and older adults (>60yo) but is rare in middle-aged adults. LABD is very similar to other skin eruptions including erythema multiforme, bullous pemphigoid, dermatitis herpetiformis, and SJS/TEN. However, LABD often does not resolve with steroids and can lead to corneal and mucus membrane scarring if not treated appropriately. This case highlights the importance of a broad differential when evaluating a patient with a vesiculobullous rash.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-15

Title: Two Sides of the Same Coin: Urethral Prolapse in a 5-year-old and 78-year-old.

Presenting Author: Charleena Skare, MS-2, William Carey University College of Osteopathic Medicine

Additional Author(s): Jennifer Rebecca Roberts, DO

Introduction/Background: Urethral prolapse (UP), a circular protrusion through the urethral meatus, is a rare condition affecting one in 3000 women, who are primarily pre-pubescent or post-menopausal. The presentation varies within these two populations; pre-pubescent patients are generally more asymptomatic, while post-menopausal women have more symptoms and sequelae. Previous research has primarily examined etiology and management for each population independently and thus has not identified a clear bimodal distribution in occurrence age. This distribution of non-menstruating women supports the suggested etiology of low levels of estrogen leading to urethral prolapse. We aim to compare this study with outstanding literature and bring forth increased awareness of urethral prolapse presentations.

Description: The current study discusses two urethral prolapse patients: a 5-year-old female and 78-year-old female. The 5-year-old was brought to the emergency department by her parents with blood in her underwear with mild pain. The 78-year-old presented to the ED with a mass in her private area and mild pain. Both patients were able to void upon presentation. Both patients were treated conservatively and discharged with instructions for Sitz baths and topical estrogen cream prescription.

Discussion and Conclusion: These cases illustrate the importance of recognizing a condition in various populations with varying presentations and understanding management for both in the emergency room. Increased emergency physician recognition in varying demographics avoids unnecessary examinations and prompt appropriate treatment.

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Emerald Coast 2024 Abstracts

Research Abstract: 24-16

Title: Reducing Over-Reliance on Subspecialty Consultants in Residency: A Descriptive Analysis of Urology Consult Utilization in an Urban Academic ED

Presenting Author: Nikki Ahuja, MS-3, University of Alabama at Birmingham Heersink School of Medicine

Additional Author(s): Jaron Raper, MD; Max Thompson, MD; Charles Khoury, MD, UAB Emergency Medicine Department

Introduction/Background: An emerging concern in residency training programs is the potential for overreliance on subspecialty consultants, which can hinder the development of essential competencies. Objective: To assess the utilization of urology consultations at an urban academic ED and identify trends in over-consultation.

Methods: We retrospectively analyzed 543 consecutive urology consults over a one-year period. Consults were categorized into stones, stent malfunctions, catheter related issues, post-operative complications, infections, priapism, and testicular pathology. ED length of stay, hospital admission versus discharge, and surgical intervention versus medical management were reported. Results: Among the 543 consultations during the study period, stones comprised 33.5% of visits, with 41% of these patients being discharged home. The average stone size in admitted patients was 7.74mm, vs 5.82 mm ($p=.005$) in discharged patients. Other significant reasons for consultation included: Stent malfunctions (2% of visits, with 45% of these being discharged), catheter-related visits (7%), post-operative complications (6%), SSTIs (4%), priapism (1.6%), testicular pathology (6%). The average ED length of stay for all urology consults was 5 hours and 3 minutes.

Discussion and Conclusion: Conclusion: EM programs should routinely monitor consultation trends in order to decrease overreliance on subspecialists. Utilization of urology consults is common, with stones representing the most frequent reason for consultation but with a significant proportion of these patients being discharged without intervention. Preliminary results indicate that patients with stones of lesser size may be discharged without consultation. Future work will characterize consultation patterns in other subspecialties.



Emerald Coast 2024 Abstracts

Research Abstract: 24-17

Title: Use of Machine Learning Models to Predict Neurologically Intact Survival for Advanced Age Adults Following Out-of-hospital Cardiac Arrest

Presenting Author: Dylana Adams, PGY2, UAB

Additional Author(s): Dylana J. Adams, MD; Kameshwari Soundararajan, PhD; Ryan C. Godwin PhD; Ryan L. Melvin, PhD; Ryan A. Coute, DO

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Introduction/Background: Our team recently designed and published a multivariable logistic regression model that successfully predicted neurologic outcomes in advanced age adults (≥ 65 years old) who achieve return of spontaneous circulation following resuscitation of out-of-hospital cardiac arrest (OHCA).¹ Prior to externally validating this model, we sought to compare the predictive performance of our logistic regression model against common machine learning (ML) algorithms using the same dataset.

Methods: All non-traumatic OHCA occurring in advanced age adults (≥ 65 years old) who survived to hospital admission from the national Cardiac Arrest Registry to Enhance Survival database from 2013-2021 were included. The primary outcome measure was neurologically intact survival defined as a cerebral performance category (CPC) score of 1 or 2 at hospital discharge. Our original logistic regression model was compared to the Boosted Trees and Decision Tree ML algorithms² and assessed by accuracy, Area Under the Receiver Operating Characteristic Curve (AUC-ROC) and Area Under the Precision-Recall Curve (AUC-PR).

Results: A total of 83,561 OHCA were included in the analysis. Median age was 75 years (IQR 69-82), 58.9% were male, 53% were White, 67% experienced an OHCA at home, 52% were witnessed by a bystander, 44% received bystander CPR, and 34% were found in shockable rhythm. Neurologically intact survival (CPC 1 or 2) occurred in 23% of patients. The logistic regression model had an accuracy of 79.6%, AUC-PR 0.542, and AUC-ROC of 0.774. The Boosted Trees model had an accuracy of 79.2%, AUC-PR 0.555, and AUC-ROC of 0.774. The Decision Tree Model had an accuracy of 79.3%, AUC-PR 0.490, and AUC-ROC of 0.717.

Discussion and Conclusion: Boosted Trees and Decision Trees ML models performed comparably to logistic regression in predicting favorable versus unfavorable neurologic outcome following successful resuscitation of OHCA in advanced age adults. Given the similar performance, logistic regression appears to be a more suitable approach for a clinically applicable model due to its transparency in quantifying predictors and outcomes compared to the “Black Box” effect of most ML models. Future work to improve and ultimately externally validate the model is warranted.



Emerald Coast 2024 Abstracts

Research Abstract: 24-18

Title: Predicting Extracorporeal Cardiopulmonary Resuscitation (ECPR) Candidacy in a Southeastern US City

Presenting Author: Jordi Garcia-Diaz, PGY3, University of Alabama at Birmingham

Additional Author(s): Stephen Knight, MD, UAB; Ryan Coute, MD, UAB; William Ferguson, , UAB; Joseph Richardson, Birmingham Fire and Rescue

Introduction/Background: 350,000 out of hospital cardiac arrests (OHCA) occur annually in the United States, with an overall mortality rate over 90%. Extracorporeal Cardiopulmonary Resuscitation (ECPR) has emerged as a potential treatment strategy for individuals experiencing refractory OHCA with survival rates reported as high as 43% in high performing systems of care. Our objective was to estimate the potential annual volume of ECPR candidates in Birmingham, Alabama using internationally recommended ECPR inclusion criteria. Our goal is to help inform the development of an ECPR program within our local OHCA system of care.

Methods: We performed a retrospective observational analysis of adult (age >18 years) non-traumatic emergency medical services (EMS) treated OHCA from the Birmingham Cardiac Arrest Registry to Enhance Survival database from January 1, 2020 to December 31, 2022. Predetermined ECPR inclusion criteria based on published international recommendations were applied to the study population to identify OHCA with the following criteria: age <75 years, OHCA witnessed by bystander or EMS provider, bystander CPR provided, initial shockable rhythm, and arrival ED without return of spontaneous circulation within 30 minutes of arrest. The primary outcome measure was total number of ECPR candidates meeting these criteria. Secondary outcomes included potential modifiable variables to ECPR volumes. The data were reported descriptively. We estimated a volume of at least 1 case/month (36 total) was needed to maintain skills and resources required for an ECPR program.

Results: A total of 794 OHCA occurred during the study period. After applying the predetermined ECPR inclusion criteria, only 11 cases (1.39%) would have qualified for ECPR. A total of 26 patients (3.27%) had bystander witnessed arrest, but did not receive bystander CPR. An additional 27 patients (3.4%) would have met criteria, but arrived the ED outside of the 30-minute window for initiation of ECPR.

Discussion and Conclusion: At its current state, OHCA patient volume and system of care characteristics in Birmingham, AL would not support an ECPR program. Opportunities exist in modifiable variables including bystander CPR participation and EMS scene time which could potentially increase volumes to well above a sustainable rate.



Emerald Coast 2024 Abstracts

Research Abstract: 24-19

Title: Breast Cancer Risk and Access to Screening Among Female Emergency Department Patients

Presenting Author: Anupa Ghimire, MS3, University of Alabama at Birmingham

Additional Author(s): Stephen Knight, MD , UAB; Katherine Parker, MD, UAB; Stefanie Woodard, DO, UAB

Introduction/Background: Breast cancer is the most commonly diagnosed cancer in women, and the second most common cause of cancer-related death in women. Due to advances in the care and treatment of breast cancer, it is now a largely treatable and even curable illness when found early. Conversely, the treatment of late stage breast cancer is associated with significant morbidity and cost. Despite this, breast cancer screening adherence rates are still well below nationally set benchmarks. This problem is amplified among those of lower income status, uninsured, and those within underrepresented populations. The Emergency Department (ED) provides a unique opportunity to reach a significant proportion of the population, especially those at highest risk for lacking access to care. In our study, we sought to determine the feasibility of a questionnaire based strategy in identifying ED patients who are in need of breast cancer screening.

Methods: We performed a prospective, interview based screening protocol among female patients aged 40-74 presenting to the Emergency Department for moderate or low acuity complaint. Patients were excluded from the study if they had known active breast cancer, end stage terminal illness, active pregnancy, were prisoners, or cognitive/mental health illness making them unable to participate in questionnaire. Patients meeting inclusion criteria were approached by research staff, and guided through a brief questionnaire to determine overall risk as well as individual access to care.

Results: A total of 60 patients were enrolled in our study. Of those, 23 (38.33%) were found to be due for breast cancer screening. There were 6 individuals (10.0%) identified to be due for screening and also lack access to primary care. An additional 2 individuals (3.33%) were found to be at high lifetime risk for developing breast cancer.

Discussion and Conclusion: An ED based initiative for breast cancer prevention is feasible and yielded a considerable proportion of patients who are due for screening. Notably, many of these patients were also identified as lacking access to primary care to be able to obtain screening or other primary prevention. Further investigation, including potential linkage-to-care initiatives could potentially be of great benefit and prevent the late detection of breast cancer.



Emerald Coast 2024 Abstracts

Research Abstract: 24-20

Title: Self-Identification of Midline, Confirmed by CT of Abdomen.

Presenting Author: Kaitlyn Davis, MS-2, University of Arkansas for Medical Sciences - College of Medicine

Additional Author(s): Brendon Hogge, MS-2, University of Arkansas for Medical Sciences; Joel C. Mosley, MD, University of Arkansas for Medical Sciences; Hanna K. Jensen, MD, PhD, University of Arkansas for Medical Sciences; Samantha E. Robinson, PhD, University of Arkansas; Sharon C. Reece, MD, Baylor Scott & White

Introduction/Background: Lumbar punctures help diagnose a variety of conditions in the Emergency Department including meningitis, subarachnoid hemorrhage, and encephalitis. This procedure is performed by placing a hollow needle into the subarachnoid space to collect cerebrospinal fluid. This needle is typically inserted, at the patient's midline, between intervertebral spaces L3/L4 or L4/L5. The significance of where the needle is placed is quite important as the spinal cord typically terminates at the L1/L2 level.

There are currently two "gold-standard" methods used to detect the midline: the ultrasound guided method and traditional palpation by a physician. Prior research has shown that both methods can be unreliable at times ^(1,2). Studies have also shown that detecting the midline in patients with a BMI over 30 becomes increasingly difficult ⁽²⁾.

The purpose of this study is to determine if self-palpation in detecting a patient's midline will improve the accuracy of finding the ideal spaces for lumbar punctures.

Methods: Patients arriving at the Washington Regional Emergency Department requiring a CT of their abdomen are who we would approach to screen and consent for participation in this study. If the patient consents, they will be presented an image of the spine and will be instructed to palpate their superior iliac crests and move their hands medially to point to their midline. A self-adhesive, radiopaque BB marker will be placed to where the patient points to. This marker can be visualized on the CT image that is needed for their care.

These images will be measured to see how far off the BB marker is from the ideal spaces for a lumbar puncture - both in horizontal and vertical measurements.

Results: This study is currently in the data collection stage. While we do not yet have final results, we do have de-identified CT scans of our participants to present.

Discussion and Conclusion: Conclusions will be drawn once 50 patients have been enrolled and data collected. This study would like to show that self-palpation in detecting a patient's own midline will help improve the accuracy and efficiency of lumbar punctures in combination with the proven gold-standard methods.



Emerald Coast 2024 Abstracts

Case Study Abstract: 24-21

Title: Bronchiolitis or Beyond? DKA diagnosis in a Pediatric Respiratory Presentation

Presenting Author: Kelsey Byrd, PGY-3, Louisiana State University New Orleans Emergency Medicine

Introduction/Background: Pediatric presentations of respiratory distress present diagnostic intricacies, particularly when symptoms mimic prevalent respiratory illnesses such as bronchiolitis. Young children with this diagnosis often receive scant to minimal laboratory assessments. Bronchiolitis is after all, the most common etiology of pediatric respiratory distress. Clinicians may anchor on this as the cause of respiratory distress especially during seasons of increased incidence. We must however, consider instances where the initial presentation relates to an underlying metabolic disturbance which ultimately leads to diagnostic challenges and potential delays in appropriate management. We present a case that highlights expanding the diagnostic dilemma encountered when a patient initially diagnosed with bronchiolitis, fails to show improvement despite conventional intervention such as high flow oxygen therapy. Re-evaluation revealed an unexpected diagnosis of diabetic ketoacidosis (DKA) in a 9 month old, re-affirming the importance of maintaining a broad differential diagnosis in all ages and considering metabolic disturbances in patients with atypical clinical courses in the emergency department (ED) setting. The age of onset for type 1 diabetes mellitus exhibits bimodal distribution, with a notable peak typically occurring between 5 to 7 years old, followed by a secondary peak between 11 to 13 years old, observed across various populations globally¹. Through this case, we aim to make the case for continuing workup to avoid delays in diagnosis in children outside of the expected age range of diagnosis. This case serves as a poignant reminder of the necessity for clinicians to uphold a broad differential diagnosis, incorporating metabolic perturbations such as DKA, notwithstanding atypical clinical manifestations.

Description: A 9-month-old girl who presented to the ED with a chief concern of increasing shortness of breath over the past 3 days. She is a twin born at 35 weeks gestation requiring a stay in the NICU. She initially presented to the emergency department the day prior and was diagnosed with RSV bronchiolitis. Her family had already attempted humidified air and frequent nasal suctioning without improvement her symptoms. They denied any fever or chills. They noted decreased oral intake, but no decrease in the number of diapers that she soiled. She had not had any emesis. Her symptoms had persisted for 3-4 days, but they acutely worsened overnight which prompted a visit to the ED. Her family noted her lack of weight gain compared to her twin and increased thirst. She was supposed to follow up with her well-baby visit but missed the appointment and had not had recent labs.

On physical exam, the child was ill appearing. She was tachycardic with a pulse of 163, afebrile, and tachypneic with a respiratory rate in the 60s. She was fatigued appearing. She was minimally interactive and tearful. Mucous membranes appeared dry. She had accessory muscle usage, rhonchi, and grunting on exam. The initial laboratory evaluation included a comprehensive respiratory panel which was positive for adenovirus and RSV. A chest x-ray was ordered showing no acute cardiopulmonary process. She was trialed on high flow nasal cannula and plans were made to admit her to the pediatric ICU for further care. She initially appeared to improve. However, on reevaluation, she continued to have respiratory distress despite oxygen supplementation up to 2L/kg and DuoNeb treatment. At this point, a capillary blood gas with electrolytes was ordered. To our surprise, the patient had a pH of 6.87, PCO₂ of 15 mmHg, and a blood glucose of 729 mg/dL. IV access was established and we continued the workup for DKA including a CBC significant for a white blood cell count of 37.4 (10³ μ L). Her beta-hydroxybutyric acid was elevated to 147.47 mg/dL. Her urinalysis unsurprisingly showed 3+ glucose and ketones.

This prompted us to start fluid resuscitation with a 20cc/kg normal saline bolus and subsequent initiation of an insulin infusion with potassium and dextrose fortified fluids using the two-bag method. She was admitted to the ICU for two days for further management and started on Lantus 2.5 units with sliding scale Lispro. Child life psychologists and diabetes education specialists were consulted to assist with family understanding of this typically life altering diagnosis. She was discharged in stable condition home with continued follow up with pediatric endocrinology.

Discussion and Conclusion: This uncommon diagnosis of DKA in a 9 month old presenting with respiratory distress initially attributed to RSV and adenovirus bronchiolitis underscores several key considerations in pediatric emergency care. It presents the common diagnostic challenges and biases that physicians face when presenting with common presentations. This case begs the reader to broaden their differential of relatively simple appearing respiratory distress in children. It is important to not delay diagnosis and treatment of metabolic imbalances should they exist. This patient's family made two visits to the emergency department and were persistent. All too often social drivers of health may pose limitations to patients and their family. Health literacy often presents barriers when caregivers and parents attempt to advocate for their children. It is important for physicians to exclude the worst causes of respiratory distress. Type 1 DM carries a mortality rate 3-18 times higher than would be expected than the general population². We often avoid collecting labs in pediatric patients to avoid parental and patient dissatisfaction or trauma. There are ways however to mitigate this. Studies show that parental participation during venipuncture contributed to better management of distress and pain³. This opens the door for discussion and more research for optimal trauma-informed care in pediatrics. Children presenting in respiratory distress who are not improving should have intravenous access or at the very least a capillary blood gas with electrolytes prior to discharge.

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Emerald Coast 2024 Abstracts

Case Study Abstract: 24-22

Title: Managing Severe Horse Bite Injuries: A Rare Case Presentation and Clinical Course

Presenting Author: Banks Harris, MS-3, University of Arkansas for Medical Sciences

Additional Author(s): Lauren McCaslin, MD, Department of Emergency Medicine, Washington Regional Medical Center

Introduction/Background: Injuries resulting from animal bites can lead to a spectrum of complications, varying from minor wounds to severe infections. Animal bites account for nearly 2% of all admissions to emergency departments. Dog bites represent the majority (80% – 90%) of animal bites, followed by cat bites, and human bites, with donkeys and horses infrequently biting humans [1]. While uncommon, horse bites are associated with the higher mortality rates compared to other bites. [2]. In this report, we present an exceedingly rare case exemplifying the severity of horse bites and optimal management strategies. Horse-related injuries pose unique challenges due to the nature of the trauma inflicted. We present a case of a 42-year-old female who sustained a significant avulsion injury to her left arm following a horse bite, highlighting the importance of prompt assessment and management in such cases.

Description: The patient, a 42-year-old female, presented to the emergency department after sustaining a horse bite injury to her left arm while leading her horse by its reins. While leading the horse, it essentially attacked her, biting her arm and ripping down the dermal plane resulting in what looks like an anatomic dissection. The patient was thrown to the ground without loss of consciousness. Upon arrival, the patient reported severe pain in her left upper extremity, with a large area of missing dermis extending from the shoulder to the mid forearm.

Medical History: HTN

Physical Exam: Examination of the left arm showed complete avulsion of the dermal layer, with exposure of subcutaneous fat, muscle, and the basilic and median cubital veins. Despite the extensive injury, the patient demonstrated normal movement and distal sensation in her left upper extremity. Field hemostasis and intravenous access were promptly established, and the patient received cefazolin en route to the emergency room. Upon arrival, a thorough examination revealed a complete avulsion of the dermal layer extending from the proximal humerus to the mid forearm, exposing underlying fat, muscle, and vascular structures. The wound was meticulously irrigated with normal saline (2000mL), ensuring thorough cleansing. Despite the severity of the injury, neurovascular integrity remained intact, and the patient retained normal movement and distal sensation in her left upper extremity. Following wound assessment, the patient received a tetanus vaccination, and X-rays were performed, revealing no acute findings. To maintain fluid balance, a Lactated Ringers intravenous bolus (1000mL) was administered. A trauma consultation was promptly initiated, determining the patient to be stable for transfer to an outside facility. Subsequently, the patient was transferred to an outside hospital for further management and skin grafting, ensuring continuity of care and appropriate follow-up for her complex injury. This clinical course emphasizes the critical role of prompt assessment and interdisciplinary collaboration in managing traumatic injuries, particularly those involving avulsion of the dermal layer, to optimize patient outcomes and mitigate

Discussion and Conclusion: Horse bites, though uncommon, can cause significant injuries, accounting for 3% to 4.5% of reported horse-related injuries [3]. The force of a horse's jaws can lead to a wide range of injuries, from minor contusions to severe tissue damage. Infections from horse bites typically involve a mix of bacteria, including *Actinobacillus*, *Staphylococcus*, *Streptococcus*, *Pasteurella*, *Fusobacterium*, and *Bacteroides* species [4, 5]. In such cases, assessing the circumstances of the bite and the health status of the animal is vital, along with evaluating the patient's vaccination history and infection risk factors. Rabies post-exposure prophylaxis is warranted for individuals bitten by a rabid animal, but unnecessary if the animal remains free of rabies symptoms during a 10-day observation period, as was the case with our patient [6]. Wound management includes cleaning, irrigating, exploring for foreign bodies, and debriding the wound. While some recommend antiseptic solutions, normal saline is commonly used, with caution against pressurized irrigation to avoid bacterial spread [7, 8]. Antibiotic prophylaxis is generally not effective in reducing infection rates, except in high-risk patients or for hand bite wounds [9]. Due to the intricate anatomy of the hand and the bacterial composition of a horse's mouth, bite injuries can result in significant infections and functional limitations. Timely and thorough management coupled with vigilant monitoring typically yields favorable outcomes.

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