

## SMA's 2020 Southern Regional Assembly Abstract Presentations

The following abstracts were accepted and presented during Southern Medical Association's virtual Southern Regional Assembly, October 9-10, 2020, and are listed in order of presentation. *Abstracts are published as submitted. Please note, all figures and tables are published in black and white. To view these in color (where applicable), visit <https://sma.org/abstracts>.*

### **Assessing the Barriers & Benefits Associated with Using Psychiatric Advance Directives to Guide Care within the Emergency Department**

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Emergency & Disaster Medicine

#### **Abstract**

**Background:** While psychiatric advance directives (PADs) have been used within the field of mental health for a number of years and have been proven to reduce the need for coercive intervention, increase post-discharge treatment adherence, and improve medication compliance, they remain an underused and under-investigated tool in patient care. In the field of emergency medicine, a discipline which has a high level of interaction with psychiatric patients, little to no literature is available concerning the use of PADs to guide clinical psychiatric care within the emergency department (ED). This study sought to examine some of the potential benefits and barriers were PADs to be utilized within emergency medicine.

**Methods:** These were elicited via key informant interviews with emergency medicine physicians working within the University of North Carolina healthcare system and through a substantive review of available literature regarding the use of PADs in the field of psychiatry. A total of 5 interviews were performed between the dates of May 1st, 2019 and July 31st, 2019. Feedback provided by participants was analyzed and organized into themes in order to compile a list of benefits and barriers identified.

**Results:** Benefits elicited included – preservation of patient autonomy and self-determination, improved patient buy-in, and increases in efficacy of treatment. Barriers fell into three major categories – patient factors, proxy factors, and document factors. Additionally, a confounding factor to all three of these is the time and desire of the treating emergency provider to pursue the identification and use of a PAD.

**Implications:** Solutions to the most commonly cited concerns by participants are proposed and discussed in this study. These include promotion of facilitated PAD completion sessions and creating an accessible and clearly labeled location within electronic health records (EHRs) for PADs to be filed.

#### **Learning Objectives**

- 1) Examine the function of psychiatric advance directives in clinical medicine
- 2) Examine the potential for psychiatric advance directives to improve psychiatric care within the emergency department if certain barriers can be addressed appropriately

## Unintentional overdose with over-the-counter salicylate products in an elderly patient.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Emergency & Disaster Medicine

### Abstract

**Introduction:** There are several different forms of salicylate-containing substances on the market today. There is increasing concern regarding the risk of consumers unintentionally misusing over the counter (OTC) medications containing salicylates. Salicylates are used to relieve pain and inflammation, to reduce fever, and to prevent blood clotting. The most well known is aspirin, or acetyl salicylic acid. One of the most popular forms is Anacin, containing aspirin and caffeine. An old medication, it has been popular since the 1930s. Salicylates can also be found in bismuth salicylate (Pepto Bismol) and oil of wintergreen. It is imperative that emergency medicine clinicians recognize the wide array of over-the-counter substances containing salicylate, and signs and symptoms of acute ingestion to quickly prescribe the appropriate treatment. Additionally, many of the signs and symptoms are not initially evident, especially in the elderly, and may be mistaken for dementia or delirium. The purpose of this article is to discuss common OTC medications containing salicylates, the signs and symptoms patients may display, and current trends in the treatment of this toxic syndrome.

**Case Presentation:** A 79-year-old woman presented to a community hospital in Corinth, Miss., with altered mental status and hallucinations with a fall at home. She had a history of dementia and chronic arthritis. The patient's son mentioned that his mother takes Anacin excessively. She does not remember how many pills she takes most of the time for her chronic knee pain, likely due to her chronic dementia. She had been warned repeatedly about this medication, but has a friend to get it for her from a local drug store. Her physical exam demonstrated tachypnea and tachycardia, altered mental status, and visual hallucinations. In an elderly patient with altered mental status, the differential diagnosis includes, but is not limited to, hypoxia, encephalopathy, stroke, intracranial hemorrhage, infection, nutritional deficiencies, pain, myocardial ischemia, electrolyte abnormalities, medication interactions, seizure and trauma.

The patient's workup included a complete blood count (CBC), complete metabolic panel (CMP), urinalysis with drug screen (UA and UDS), point of care blood glucose, electrocardiogram (EKG), troponin, portable chest x-ray, arterial blood gas, and computed tomography (CT) scan of head. Patient's test results revealed an unremarkable CBC, CT scan of head, and chest x-ray. Her CMP revealed a normal blood sugar of 94 mg/dL, but a decreased bicarbonate of 9, and mild acute kidney injury, with a BUN 26 and creatinine of 1.3. The troponin level was increased at 0.435. Her ABG revealed a metabolic acidosis with a compensating respiratory alkalosis, with a pH of 7.376, pCO<sub>2</sub> of 11 and bicarbonate of 6.7. Patient's urinalysis revealed a pH of 5.0, large ketones, and moderate blood. She was also positive for a urinary tract infection. Her initial serum salicylate level was significantly increased at 61.5 mg/dL (upper therapeutic limit, 30mg/dL), consistent with a chronic ingestion. In an acute ingestion, salicylate levels may be as high as 90-100 mg/dL.

**Final/Working Diagnosis:** Chronic Salicylate Toxicity

**Management/Outcome/Follow-up:** In the emergency department, poison control was consulted, and the patient was started initially on intravenous sodium bicarbonate 1-2 mEq bolus, followed by 150 mEq of bicarbonate mixed with of one liter of D5W. This was run at 250mL/hr. Since this was not an acute ingestion, activated charcoal was not

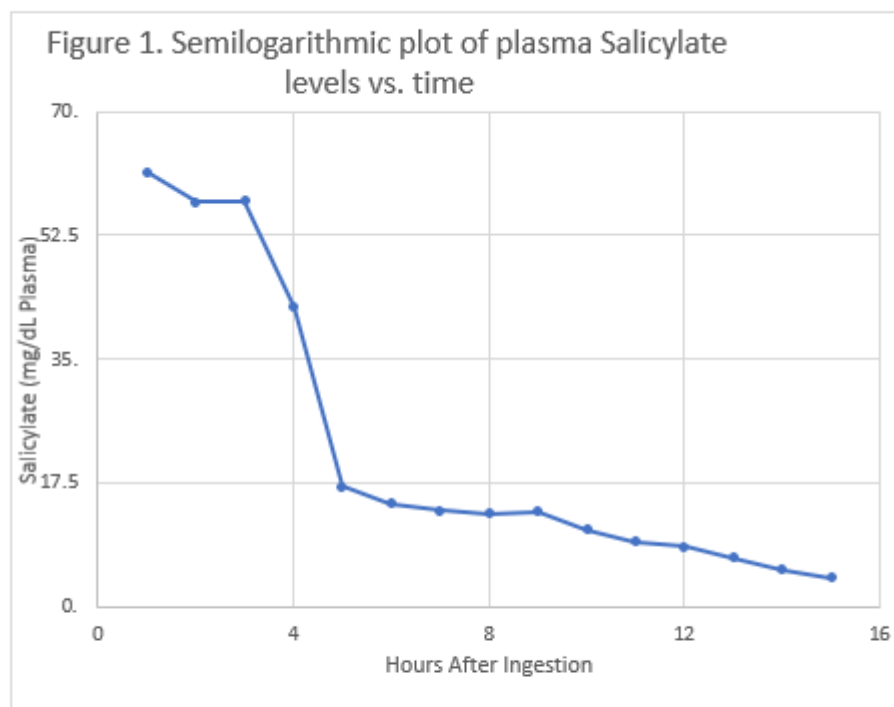
indicated. In the medical intensive care unit, she had potassium replacement and acute hemodialysis, with the bicarb drip continuing at declining rates over the next several hours. Her serum salicylate level continued to trend down to 4.1 mg/dL upon discharge.

### Learning Objectives

Upon completion, attendees should be better prepared to:

- 1) Recognize over-the-counter substances containing salicylate.
- 2) Summarize the chronic symptoms of salicylate toxicity.
- 3) Identify the medications or treatment to reverse salicylate toxicity.

### Tables and/or Figures



**Figure 1.** Salicylate levels were measured at 15 points over 16 hours of a 79-year-old-female with a history of dementia and acute neurologic symptoms due to salicylate toxicity. The initial salicylate level was significantly increased at 61.5 mg/dL (upper therapeutic level is 30 mg/dL), indicating chronic salicylate toxicity. Serum salicylate levels decreased following treatment that included intravenous sodium bicarbonate, which began at hour of presentation to the emergency department, and hemodialysis in the MICU.

## Euglycemic Diabetic Ketoacidosis

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Emergency & Disaster Medicine

### Abstract

**Introduction:** Widened anion gap metabolic acidosis is encountered in the emergency department with regularity and has a limited differential diagnosis. We present a case where the etiology was not immediately apparent but was eventually determined to be caused by the recent initiation of dapagliflozin, a SGLT2 inhibitor, for the management of Type 2 diabetes.

**Case Presentation:** A 67 year-old-male with insulin requiring Type 2 diabetes presented to the ED with nausea and vomiting for several weeks. He had been recently noted by his endocrinologist to be losing weight and was warned his insulin requirement may decrease as a result. He had been started on a new drug but was unable to recall its name. He also complained of being weak and fatigued. He had no infectious symptoms. His physical exam, including vital signs, were unremarkable. Noteworthy labs included glucose 171, CO<sub>2</sub><5 with a venous pH 7.058 and BUN/Creatinine 15/1.0. Urinalysis and CXR were normal. He denied ingestion of or exposure to toxic alcohols, salicylates or other agents that could produce a widened anion gap metabolic acidosis. It was subsequently established that the medication he had recently been started on was dapagliflozin.

**Final Diagnosis:** Euglycemic DKA

**Management:** He was admitted to the ICU and treated with an insulin infusion and D5 ½ NS. Especially close monitoring of the glucose and insulin infusions was continued until resolution of the metabolic acidosis. Once his acidosis corrected, he was transferred out of the ICU and was subsequently discharged home with instructions to discontinue dapagliflozin and follow up with his endocrinologist.

### Learning Objectives

- Identify euglycemic diabetic ketoacidosis in the emergency department setting.
- Treat widened anion gap metabolic acidosis.

## A Rare case of anorexia nervosa leading to hypokalemic nephropathy

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

Introduction;

Although the complications of psychiatric conditions are vast, irreversible kidney damage as the leading cause of death is an infrequent occurrence. There have not been many documented cases that discuss how an eating disorder results in chronic metabolic disturbance due to permanent scarring of the renal interstitium.

### Case Presentation

A 27-year-old man with history of anorexia nervosa, depression, anxiety, osteoporosis, and “K+ wasting disorder” presented to ED with CC of cramping in his hands and lower legs. His symptoms began the previous day and gradually worsened. He has had many prior admissions from the ages of 19 to 27 at various facilities with similar complaints, during which he has always shown to have K+ levels <2.0. He was being followed by a nephrologist who had him on a total of twenty-six 20mEq KCl tablets on daily basis.

Vitals;

Pulse 77, Respirations 16, Blood Pressure 90/58, Pulse ox 95% on room air, Weight 51.2 Kg, Height 72inch, BMI 15.325

General: Cachectic Adult male lying in bed in no acute distress

Head: Atraumatic, normocephalic

Eyes: PERRLA, no conjunctivae injection

ENT: Oropharynx without erythema, edema, or exudates

Neck: Supple, trachea midline, no lymphadenopathy

Cardiovascular: RRR no rubs, gallops, or murmurs, no carotid bruits, no edema

Respiratory: CTA bilaterally, no rhonchi, wheeze, or rales

Abdominal: Soft, non-tender, non-distended, + BS, no guarding, rebound, or masses

Extremities: Pulses 2+ x4, no clubbing or cyanosis

Musculoskeletal: BUE, BLE Strength 5/5, symmetrical, ROM intact

Integument: No rash, lesion, ulcers

Neurological: A&O x 3; CN II-XII intact

Psychiatric: Affect, Language, Behavior appropriate

Key laboratory findings;

K+ 1.7mmol/L (Baseline 2.5mmol/L), Mg levels 2mg/dl (Baseline 2.0) , CO2 > 45 mmol/L (Baseline >45).

ABG demonstrated severe metabolic alkalosis at pH 7.63, pCO2 74, pO268, HCO3 77.8

UA- pH 8.0, Specific gravity <1.005, Protein, Glucose, Ketones, Bili, Leuk esterase, Nitrite all negative

Urine Osmolality 151, Urine Na random 28, Urine Cl random 29, Urine K+ random>180, Urine Calcium random 21, Urine Cr random 52, Ur Cr:Ca 0.4 (indicating hypercalciuria)

### Final Working Diagnosis

#### Hypokalemic Nephropathy and its pathophysiology

Chronic potassium depletion in humans produces characteristic, although nonspecific vacuolar lesions in the epithelial cells in the proximal tubule and occasionally the distal tubule. This abnormality generally requires at least one month to develop and is readily reversible with potassium repletion. However, prolonged hypokalemia (as with surreptitious diuretic use, eating disorders, laxative abuse, or primary aldosteronism) can lead to more severe changes, including interstitial nephritis and fibrosis, tubular atrophy, and cyst formation that is most prominent in the renal medulla. The pathogenesis of these changes is not well understood. One hypothesis that has been documented in experimental animals is that the hypokalemia-induced increase in renal ammonium production described above results in ammonia accumulation in the interstitium. This ammonia can activate complement, which may then damage the tubular cells. The associated intracellular acidosis is a stimulus for cell growth that could account for the cellular proliferation required for cyst formation.

Another possible explanation for renal injury is alterations in growth factors and cytokines in response to hypokalemia. These include vascular endothelial growth factor, insulin growth factor-I, insulin growth factor binding protein-1, angiotensin II, monocyte chemoattractant protein-1, and/or transforming growth factor-beta

#### Outcome;

The uncommon outcome of how an eating disorder lead to irreversible kidney injury which resulted in the death of young 27-year-old patient, lead to the presentation of this unique case study to include hypokalemic nephropathy in the differential of patients with prolonged state of hypokalemia. However, other chronic causes of hypokalemia such as Bartter syndrome and Gitelman syndrome must also be properly ruled out prior to establishing the diagnoses of hypokalemic nephropathy.

#### Learning Objectives

The presentation slides will include the following learning objectives

Upon completion of this lecture, learners should be better prepared to approach a patient with hypokalemia with identification of possibly etiologies, among which a key discussion point is metabolic alkalosis which requires further breakdown by demonstrating knowledge of diagnostic measures to compare and contrast the differentials under the metabolic abnormality.

## Subfalcine Herniation and Ventriculomegaly: An Unusual Finding in a Healthy Woman

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Emergency & Disaster Medicine

### Abstract

#### Introduction:

Headaches are a common complaint in the emergency department and urgent care setting. There are some unusual causes that require further evaluation. One of these is arachnoid cysts. Arachnoid cysts are fluid-filled sacs that occur in the arachnoid membrane that covers the brain (intracranial) or spinal cord (spinal). Primary arachnoid cysts are present at birth and are the result of developmental abnormalities during fetal growth. Secondary arachnoid cysts can be the result of injury, meningitis or a complication of brain surgery.

#### Case presentation:

A 24 year-old woman presented to an urgent care clinic with chief complaint of headache. She reports significant increase in her migraine symptoms which started to limit her activities. After further evaluation, an outpatient CT scan was ordered. This study revealed a large arachnoid cyst producing mass effect and thereby causing significant herniation. The patient was transferred to a tertiary care center for neurosurgical consultation.

#### Final/working dx:

The acute onset of worsening migraine symptoms in an otherwise health adult woman raises the suspicion of a more perilous diagnosis. The significant change in headache frequency and intensity led to further imaging to rule out secondary causes. Diagnosis of an arachnoid cyst was confirmed in this case. Treatment depends on the location and characteristics of the cyst.

#### Management/Outcome:

This case illustrates an uncommon diagnosis in patients with headache. Any change in baseline of a patient's headaches should warrant further evaluation. The previous clearance of the patient in other clinics should not cloud one's clinical decision making. Patients diagnosed with arachnoid cysts should be evaluated by a neurosurgeon. Management options range from no treatment to surgical repair with shunt or fenestration.

### Learning Objectives

1. Differentiate between primary vs secondary headache disorder
2. Diagnose and guide treatment for arachnoid cyst management

## Thinking Outside of the Box: A case of extra-pulmonary gastric small cell carcinoma

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Small cell carcinoma is a neuroendocrine tumor that most commonly arises in the lung but has also been found to originate in a wide variety of extrapulmonary sites. Extrapulmonary small cell carcinomas (ESCCs) are extremely rare; approximately 1000 cases are reported annually in the United States, comprising 0.1-0.4% of all cancers. Gastric ESCC, more commonly seen in Japanese male patients in their seventh decade of life, comprises 8.3–14.5% of ESCC. Our case of a very rare condition is to highlight the importance of including small cell carcinoma in the workup of a gastric malignancy as it has the tendency to present similarly to other, more common, gastric malignancies, but with a very aggressive nature and overall poor prognosis. Less than 15 percent of patients survive up to five years. The hope is to bring more awareness to the existence of this rare subtype of small cell carcinoma in order to diagnose patients earlier in the disease and optimize disease management.

**Case Presentation:** We present a case of a 72-year old Hispanic male who presented to the emergency department complaining of epigastric abdominal pain and dyspepsia that started 2 days prior. He denied any diarrhea, nausea, vomiting, fever, chills, or blood in stool. Computed tomography scan of abdomen revealed a lobulated soft tissue mass in the proximal stomach measuring at least 8.9 x 7.4 cm. Findings were concerning for malignancy and patient was admitted for further evaluation. Differential diagnostic considerations at this time included lymphoproliferative disorder, gastric adenocarcinoma, or metastasis. Esophagogastroduodenoscopy with endoscopic ultrasound revealed a mass that invaded the gastro-esophageal junction. Surgical-Oncology was consulted and recommended laparoscopy and port placement to obtain histological diagnosis and staging due to the very suspicious presence of adenocarcinoma. Initial gastric mass biopsy revealed fibrotic tissue with a focus of lymphocytes. Due to inconclusive pathology, an open biopsy of the perigastric mass was scheduled.

**Final Diagnosis:** Final pathology report revealed high grade neuroendocrine carcinoma of gastric origin (small cell carcinoma). When the patient had returned 2 months later for evaluation of anemia, CT abdomen revealed right hepatic lobe lesions which were not visualized on the initial scan, reflecting the rapid progression of small cell carcinoma.

**Management:** Due to tumor progression, post-op complications, and morbidity and mortality rate, patient was not considered a candidate for surgery and was recommended to undergo chemotherapy treatment.

### Learning Objectives

Upon completion of this lecture, learners should be better prepared to recognize atypical pathologic diagnoses such as gastric small cell carcinoma to include in their workup of gastric cancer. The purpose of this case study is to bring more awareness to the existence of this rare subtype of small cell carcinoma in order to optimize disease management. Since gastric ESCC is notable for having a greater incidence in Japanese male patients, literature is limited regarding non-Asian populations. Meta-analysis of worldwide gastric small cell carcinomas may be an avenue to improve early diagnosis when a cure may be possible, examine disease pathogenesis, and enhance management.



## Eye Am Weak: A Case of Polymyalgia Rheumatica (PMR)

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

Polymyalgia Rheumatica is the most common chronic inflammatory condition in older adults, with an incidence of 100 per 100,000 in patients over 50 years old. It is associated with Giant cell arteritis, which is the most common type of vasculitis in adults that can result in blindness.

#### Case Presentation:

A 73 year-old-male with PMH significant for Type II Diabetes, hypertension, and history of anterior uveitis with HLA-B27 antigen (recent flare 2 weeks ago) presents to ED for chills, weakness, difficulty getting up from couch, bilateral wrist and leg pain, 8-days of joint pain/stiffness especially after lying down. Vital signs were normal, and physical exam was remarkable for mild thyromegaly and 4/5 muscle strength in L2, L3. Initial differential diagnosis included PMR, myositis, and diabetic neuropathy. Labwork revealed CRP 17.5, ESR >130, platelets 438, CK 32, HgbA1c 8.3, TSH within normal limits.

#### Final/Working Diagnosis:

Considering the patient's abrupt onset of bilateral proximal muscle weakness of shoulder and pelvic girdle, and wrists, relatively preserved muscle strength, prolonged morning stiffness, lack of chronic pain syndromes, elevation of acute phase reactants, slight thrombocytosis and normal CK, PMR was the final diagnosis. He did not have temporal tenderness, jaw claudication or new-onset headache, so no workup for Giant Cell Arthritis was performed at this time.

#### Management and Follow-up

He was given Prednisone 80 mg in the ED with vast improvement of his symptoms the following day, and discharged home on Prednisone 20 mg daily with PCM follow up and rheumatology referral. His diabetic medications were adjusted in anticipation of higher blood glucose levels, and he was placed on a proton pump inhibitor for GI protection while on steroids. He was later found to be positive for dsDNA antibody, indicating that he had multiple autoimmune diseases to include spondyloarthropathy, PMR, and lupus.

#### Learning Objectives

- Diagnose and treat PMR based on key clinical features and laboratory findings
- Recognize link between PMR and Giant Cell Arthritis, and perhaps other autoimmune conditions
- Anticipate effect of treatment on patient's existing conditions and adjust as necessary.

## A RARE CASE OF TUBERCULOSIS PRESENTING AS VOCAL CORD NODULE, SUBMENTAL ABSCESS AND TRACHEOESOPHAGEAL FISTULA IN A RENAL TRANSPLANT RECIPIENT

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Among transplant recipients, atypical bacterial infections are not uncommon. Tuberculosis (TB) can have unusual manifestations, especially in immunocompromised hosts. Diagnosis of TB should be considered if a patient born in TB-endemic area presents with unusual symptoms. Upper respiratory involvement of TB is rare and can include granulomatous lesion of nasopharynx, epiglottis, larynx etc. Esophageal manifestation of TB although rare can be challenging to diagnose and requires prompt treatment to prevent complications.

**Case Report:** A 72 year old Hispanic Male received a deceased donor renal transplant in May 2018 for end stage renal disease secondary to long-standing hypertension and type 2 diabetes mellitus. He was maintained on triple immunosuppressive regimen of Tacrolimus, Mycophenolate and Prednisone with excellent renal allograft function. In July 2019, he presented with hoarseness of voice. Direct laryngoscopic evaluation revealed a left vocal cord cystic lesion. Excision biopsy revealed caseating granulomas. AFB and fungal stains were negative. In September 2019, he presented with swelling under chin. CT showed submental abscess. He underwent I&D and treated with empiric antibacterial therapy given negative bacterial cultures. In October 2019, he presented with cough particularly following ingestion of liquids. He also reported dysphagia to both solids and liquids. An esophagogram was performed which revealed tracheoesophageal (TE) fistula. CT chest showed left lower lobe aspiration pneumonia. EGD and bronchoscopy confirmed TE fistula and biopsies were obtained that showed acute inflammation and negative for malignancy. TE fistula was repaired surgically. Given patient born in TB endemic area as well as exposed to family members travelling to Mexico, immunosuppressed & unexplained granulomatous vocal cord lesion, submental abscess and TE fistula, TB was suspected. Serial induced sputum samples were obtained. AFB stain and culture were positive and PCR confirmed *M. tuberculosis* species. He was initiated on regimen of Isoniazid, Pyrazinamide, Ethambutol and Levofloxacin. Rifampin was avoided given drug-drug interaction issues with Tacrolimus. Unfortunately, he developed dehiscence of TE fistula repair requiring esophagectomy, mobilization of serratus muscle flap and end esophagostomy. Pathology of esophagectomy specimen revealed transmural defect with acute, chronic and granulomatous inflammation. AFB stain was positive for acid fast bacilli. He required 2 subsequent chest washouts after and currently convalescing.

**Discussion:** We present an interesting and unusual case of upper respiratory tract and esophageal TB without involvement of lungs. These manifestations are rare and if undiagnosed can be life threatening especially in immunocompromised patients. Isolated lesions affecting the upper respiratory tracts are usually due to inhaled spores. Endoscopy with histopathological examination can help in establishing the diagnosis. Esophageal manifestations of TB should be treated promptly with antituberculous therapy as delay in diagnosis can lead to esophageal stenosis, ulcerations and TEF formation which require extensive surgical interventions like in our case.

## Lambl's excrescences: An Uncommon Source of Emboli

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Background:

Strokes or cerebrovascular accidents carry significant morbidity and mortality weight in the United States and is the fifth leading cause of death (1). Cardiac sources for emboli account for 14-30% of all ischemic strokes (2). Lambl's excrescences (LE) are rare outgrowths on the coaptations sites of the heart valves that appear to be thin, filiform, mobile strands on echocardiogram (3).

#### Case presentation:

A 75 year-old male with a known past medical history of coronary artery disease status-post coronary artery bypass surgery x3 in 2005, who presented to the hospital in September 2019, complaining of lightheadedness and vertigo. A CT scan of the head was done as part of stroke protocol, and showed age-related parenchymal volume loss, small vessel disease, small right posterior parietal lobe cortical infarct. MRI of the brain the next day was done showing a small foci of subacute infarct in the right parietal lobe and another infarct in the cerebellar vermis, consistent with embolic events.

A Transthoracic echocardiogram (TTE) revealed a left ventricular ejection fraction (LVEF) 40-50%, no LV thrombus, and no evidence of a patent foramen ovale (PFO). A transesophageal echocardiogram (TEE) demonstrated no left atrial (LA) thrombus, a normal LA appendage, but LE was seen on the non-coronary cusp of the aortic valve. An implantable loop recorder (ILR) was implanted before discharge, that later did not show any arrhythmias on interrogation.

He was started on Apixaban and Aspirin in the hospital and was discharged with a prescription and follow up as outpatient.

#### Final Diagnosis:

Lambl's excrescences are outgrowths found most commonly on mitral and/or aortic valves, capable of forming an embolus, which can then detach and cause ischemic events distally, but also a thrombus can develop on LE which can then send shower emboli (4). Multiple case reports have been described in the literature without any consensus on best management and treatment approach reached yet (5). So far, the current recommendations are to perform a TEE for diagnosis. Most authors agree on starting a trial of either dual anti-platelet therapy or anticoagulation, before moving forward to more invasive therapy options, including surgical valve replacement (6). However, there is a general consensus to manage the patients on a case-by-case basis.

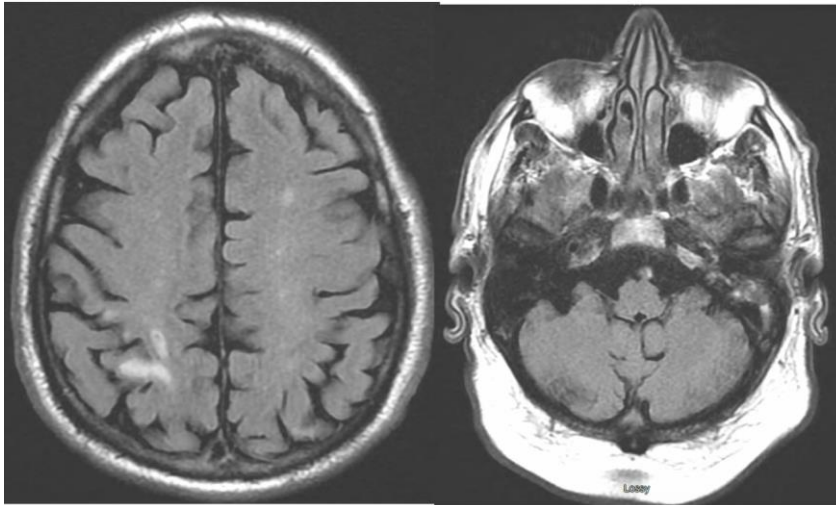
#### Conclusion:

In conclusion, a review of the most recent literature and recommendations on workup and management of Lambl's excrescences shows that there is no consensus on how to proceed. It should always be tailored to the patient and studied on a case-by-case basis, with a multi-specialty team approach including internal medicine, cardiovascular medicine as well as cardiothoracic surgeons. Although a rare condition, it should be considered in patients presenting with thromboembolic events, since it has the potential to have catastrophic outcomes.

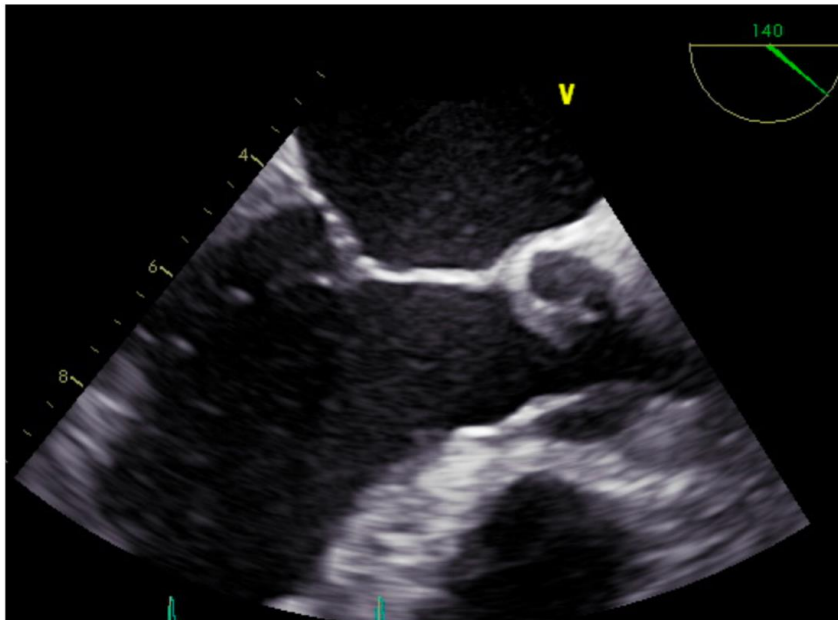
### Learning Objectives

- 1- Expand their list of differential diagnosis when it comes to embolic origin of strokes and CVA.
- 2- Introduce themselves to a rare condition that has debilitating or fatal consequences.
- 3- Review the latest literature on this condition and how to manage it.

### Tables and/or Figures



*Figure 1. Small foci of subacute infarct in the right parietal lobe and cerebellar vermis as seen on brain MRI.*



*Figure 2. LE on the non-coronary cusp of the aortic valve seen on TEE.*

## Orbital and Ocular Metastasis from Neuroendocrine Tumors: A Case Series

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Background:** Orbital and ocular metastases from well differentiated neuroendocrine (carcinoid) tumors are rare. They can be the primary presentation of a carcinoid tumor or develop during the course of the disease. Patients with orbital metastases typically present with diplopia, proptosis, and decreased vision. This report reviews the clinical presentation and treatment outcome for seven patients with well differentiated gastrointestinal neuroendocrine tumors (NET) who have ocular or orbital metastasis.

**Methods:** This study is a retrospective chart review of seven cases obtained from a single institution after receiving institution board review approval. Patient data collected included demographics, pathology, type of therapy, and survival outcomes.

**Results:** Between 1990 and 2019, 7 well-differentiated metastatic NET patients with orbital (N=5) or ocular metastasis (N=2) were identified. Tumor primary sites included pancreas, small bowel and unknown. A decrease in vision was the first manifestation in 1 of the 7 patients. Five patients had an established diagnosis of NET prior to developing ophthalmic symptoms and 1 patient had asymptomatic ocular metastasis. Staging MRI did not show any associated brain or leptomeningeal disease. Radiation therapy was delivered in 3 patients, one of which underwent surgery prior to radiation, and 1 patient received peptide radionuclide receptor therapy (PRRT). The other 3 patients were on surveillance with frequent ophthalmology exams. Three patients had expired. Two of the patients had next generation sequencing; 1 with ATM and CDKN1B genomic alterations and 1 with no alterations.

**Conclusion:** All seven patients with orbital or ocular metastasis from NET had evidence of other systemic metastases. Orbital and ocular disease was stable with no evidence of deterioration of vision.

### Learning Objectives

Although rare, ocular metastasis from NET may be under diagnosed. Early detection can help to reverse vision changes, preserve vision, and maintain a good quality of life. Physicians should have high suspicion for ocular metastasis in gastrointestinal NET patients with ophthalmic symptoms. Evaluation for such symptoms should include an ophthalmologic exam and cross sectional imaging; preferably with orbital magnetic resonance imaging (MRI).

## SOLITARY PULMONARY NODULE - AN UNUSUAL PRESENTATION

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

We are presenting a case of a unique pathological finding in a patient diagnosed with a solitary pulmonary nodule.

#### Case:

75 YO white male, with a past medical history of COPD, OSA, and HFpEF presented to the pulmonology clinic for a follow-up visit. No complaint of any cough, dyspnea, hemoptysis, fever, chills, or any recent weight change was reported. The patient has a history of falls resulting in multiple rib fractures that is evident from CT scan images (figure 6). Physical examination was negative for hepatosplenomegaly and otherwise unremarkable. Labs including CBC, serum electrolytes, and peripheral smear were clear of any acute findings as well. Chest X-ray (CXR) performed recently showed a left-sided pleural effusion and increased interstitial markings followed by a CT chest w/o contrast that was positive for an incidental 7.7 mm nodule within the left lower lobe without any calcifications. This was followed up with a PET CT that was negative for any malignant tissue, and follow up CT, recommended in 6 months, reported a slight increase in size to 10 x 9.3 mm.

An ultrasound-guided surgical lung biopsy reported ALVEOLATED LUNG PARENCHYMA WITH TRILINEAGE HEMATOPOIESIS. Figure 3 shows a microscopic appearance of the biopsied specimen. To the right, normal lung parenchyma is visible with type 1 and 2 pneumocytes. Trilineage hematopoietic cells are visible on the left. Figure 4 is a magnified version also depicting the trilineage cytology with megakaryocytes, immature red cells, and white cells, surrounded by fat cells. This was followed by a bone marrow biopsy that was reported normal. Our patient was followed in the pulmonology clinic for the next five years and remains asymptomatic to date.

#### Discussion:

The development and proliferation of hematopoietic tissue outside of the BM territory is defined as extramedullary hematopoiesis (EMH). It is a normal phenomenon during fetal development and immune responses (active EMH) but is also seen as a compensatory mechanism with an inadequate BM functioning (passive EMH) seen with various hematologic pathologies, including chronic myeloproliferative disorders (primary myelofibrosis), hemoglobinopathies (thalassemia or sickle cell anemia), and secondary to bone marrow radiation. Liver, spleen, and lymph nodes are commonly involved sites, but the kidney, adrenal gland, lung, etc. can be involved as well.

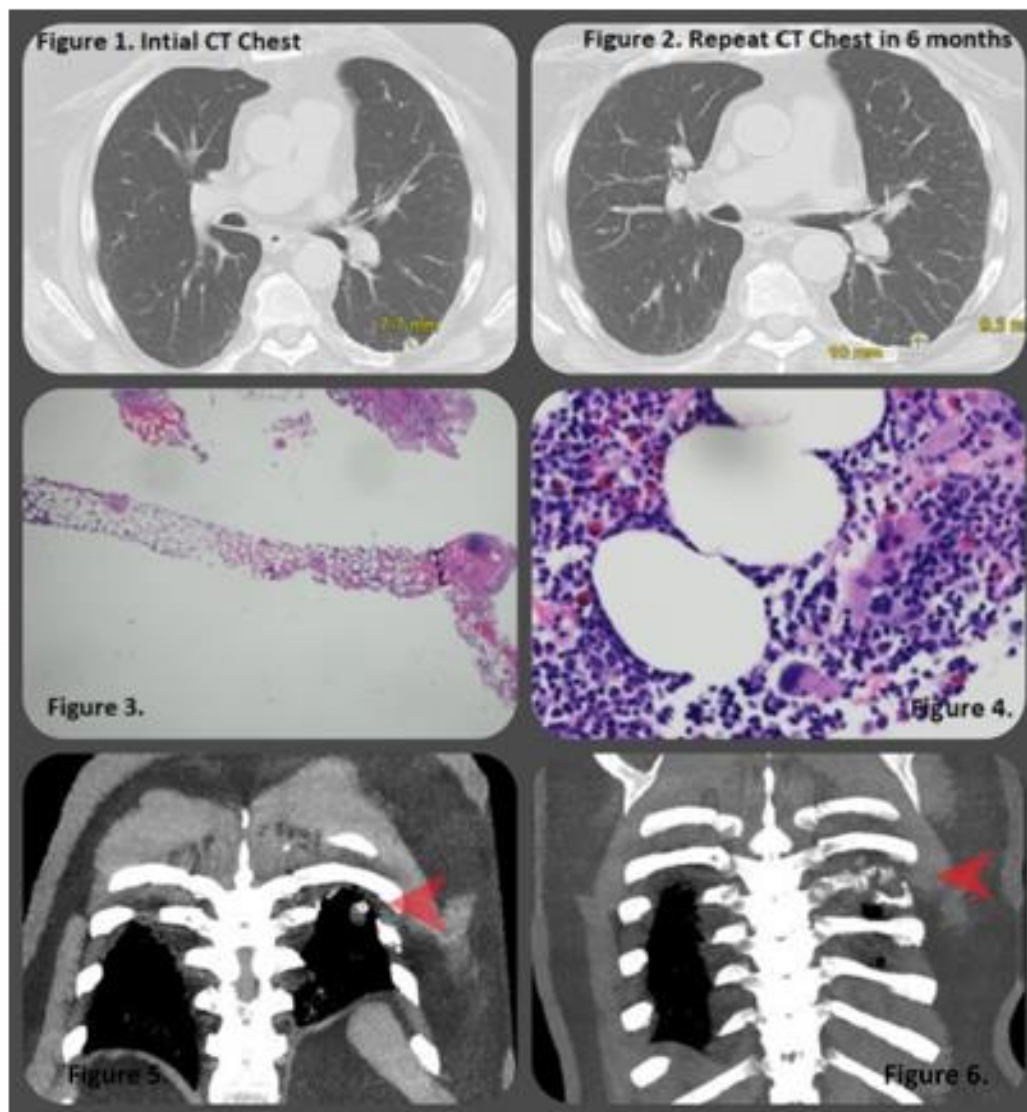
Our case is a unique presentation of trilineage EMH in a patient without any history of myeloproliferative neoplasia that was evident from a negative bone marrow biopsy. Intra-pulmonary involvement is rare, and the pathogenesis of pulmonary EMH is unclear and poorly understood. Embryonic hematopoietic stem cell, progenitor cell mobilization, and decreased splenic capacity to filter blood is the mechanism of EMH in primary myelofibrosis. Due

to the history of left-sided 4th rib fracture and the proximity of the nodule to the fracture site (figure 5 and 6), we hypothesize that the bone marrow-derived hematopoietic cells may have implanted in the pleural space and contributed to its development. The rib fracture and nodule can be visualized in figures 5 and 6.

#### Learning Objectives

- Discuss the types and associated conditions of extramedullary hematopoiesis.
- Discuss the pathophysiology of extramedullary hematopoiesis.
- Describe an uncommon presentation of extramedullary hematopoiesis in a patient diagnosed with a solitary pulmonary nodule.

#### Tables and/or Figures



## An unusual cause of upper gastrointestinal bleeding in a patient with alcohol dependence- A case presentation

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

Background: Gastroduodenal artery aneurysms (GDA) are a rare subset of visceral artery aneurysms (VAA), pseudoaneurysm of GDA being an even rarer diagnostic finding. The etiopathogenesis for these aneurysms is unclear; however, chronic inflammatory processes are considered to have significant contribution in the formation of pseudoaneurysms, likely due to injury to the vascular wall. GDAs usually present as gastrointestinal hemorrhage secondary to a ruptured vessel; less common presentations include abdominal discomfort and occasionally these are an incidental finding.<sup>1</sup> The mortality associated with a ruptured VAA is very high; hence the importance of timely intervention cannot be overstated.

Case Presentation: We present a 49-year-old African-American Gentleman with history of untreated hypertension, chronic non-steroidal anti-inflammatory medication use, alcohol dependence and nicotine dependence, who presented with acute gastrointestinal (GI) bleeding characterized by melena, associated with diaphoresis and presyncope.

He was euvolemic and hemodynamically stable at presentation with a blood pressure of 121/65, heart rate of 87, and an unremarkable physical exam. Initial evaluation showed hemoglobin (Hb) level of 12, which is his baseline. On emergent Computed Tomography (CT) Angiogram showed features suspicious for intraabdominal pseudoaneurysm at the level of the head of the pancreas. While in hospital, he had ongoing GI bleed resulting in hemodynamic instability, resulting in hypotension (98/56). He was admitted to the intensive care unit (ICU), and his Hb was noted to have dropped from 12 to 9 over approximately 6 hours.

Working Diagnosis: Actively bleeding ulcer, ruptured pseudoaneurysm

Management: Emergent esophagogastroduodenoscopy (EGD) revealed blood in the stomach and a cratered bleeding ulcer with a visible vessel in the duodenal bulb, along with a mass posteriorly. The procedure was challenging and in view of unsuccessful attempts at achieving hemostasis, vascular surgery was consulted. An emergency coil embolization procedure was performed and hemostasis was achieved successfully. (Figure 1&2) The patient tolerated the procedure well and did not have a subsequent hemorrhage.

### Learning Objectives

1. GI bleeding can be life-threatening, and management can occasionally be challenging and needs a multidisciplinary approach to manage the patient.
2. Etiology of the visceral artery aneurysms is not well documented in the literature. Still, our patient serves to highlight the association between untreated hypertension, chronic alcohol consumption and smoking, with the pseudoaneurysm formation- likely secondary to the chronic inflammation due to these underlying risk factors.



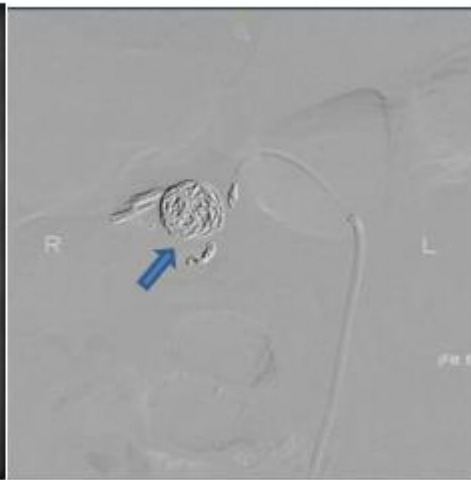
3. In view of the above, when possible, patients should be educated on the effects of elevated blood pressure on the body and the consequences of medication non-adherence in the setting of hypertension. Emphasis must also be placed on the pro-inflammatory effects of chronic alcohol abuse and nicotine dependence, and the importance of cessation of using these substances.

**Tables and/or Figures**

**Figure 1**



**Figure 2**



## COVID-19 Induced Very Late End Stent Thrombosis

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

COVID-19 is a pandemic with numerous potential complications that are not yet fully understood. The virus has been implicated in complications from its pro-thrombotic tendencies. We present a case of COVID induced very late in-stent thrombosis presenting as an NSTEMI.

#### Case Presentation

A 66 year-old gentleman with a past medical history of coronary artery disease, myocardial infarction in 2006, with PCI to left circumflex, diabetes mellitus, and hypertension, presented to the ER with complaints of chest pain that had started 6 hours prior to hospital arrival. He was noted to have ST depressions in the inferior leads as well as elevated troponin (3.72 ref 0.00-0.03 NG/ML) and was diagnosed as having an NSTEMI. Patient was taken to the cath lab where angiography was performed. Left ostio-proximal circumflex was noted to have in-stent thrombosis with 100% occlusion, TIMI flow of 0. An aspiration thrombectomy was performed along with POBA of lesion. Post intervention TIMI Flow of 3 was recorded and patient was placed on Cangrelor and loaded with Brilinta for DAPT for 1+ year. During the procedure patient was noted to have increasing work of breathing along with altered mental status and was intubated for airway protection and transferred to the MICU. Shortly after a COVID-19 nasopharyngeal test was ordered and turned positive.

#### Final Diagnosis

COVID-19 has been reported to potentially cause a hypercoagulable state. Elevated/prolonged aPTT have been reported along with d-dimer elevation, both of which were present in our patient. Hypercoagulable state caused by SARS-COV-2 infection was likely the culprit behind this patient's very late in-stent thrombosis presentation.

#### Management/Outcome/Follow-Up:

Given high thrombus burden patient was started high intensity heparin for 24 hours post procedure. COVID-19 was treated with supportive measures and he was discharged home after two weeks.

#### Learning Objectives

1. Recognize that COVID-19 can cause a hypercoagulable state leading to end organ damage and thrombotic complications.
2. In patients with COVID-19 infection and history of cardiac stenting the potential for unexpected complications exist.

## Pain in the Back: A Case Report of Pulmonary Sarcomatoid Carcinoma

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Lung carcinoma has become a leading cause of death in the USA, which has led to an increase in differentiation including multiple sub-types. Pulmonary Sarcomatoid carcinoma (PSC) is one sub-type that is characterized as a poorly differentiated non-small cell carcinoma (NSCC) containing both sarcoma and sarcoma-like components with spindle or giant cell features therefore It is difficult to distinguish PSC from true sarcomas. PSC is uncommon, representing less than 1% of all lung cancers. Typically, it occurs in older males with extensive smoking history, and has a predilection to upper lobe involvement. Limited data has shown most cases of Sarcomatoid carcinomas occur with advanced local disease and metastasis. The diagnosis is based on histopathological analysis and immunohistochemical staining for further characterization. This clinical vignette aims to present a patient incidentally found to have PSC and highlights the overall clinical course.

**Case Presentation/ final diagnosis:** A 51 y.o. white male presented with worsening thoracic level back pain over the last 3 months. He also presented with B-type symptoms including fever, weight loss and malaise. He had an extensive smoking history. Workup revealed a 5 cm left superior mediastinal mass encasing multiple great vessels as well as the trachea and esophagus with pathological fractures in T2 and T3 vertebral bodies. PET CT did not show distant organ involvement. The lung biopsy with Immunostaining showed the mass was a poorly differentiated carcinoma with spindle cells and Sarcomatoid features. Genetic studies showed both Epidermal growth factor receptor (EGFR) and monoclonal antibodies directed against the programmed death 1 (PDL1) mutation. He was not a candidate for resection due to extensive encasement of surrounding structures, and was started on palliative radiation therapy. The patient only completed 7 sessions before presenting to hospital for acute hypoxic respiratory failure. Repeat scan showed enlargement of the mass; He was transitioned to hospice and died 2 months after initial diagnosis.

**Conclusions:** PSC remains poorly explored. Typically PSC occurs in older male smokers, however this patient was 51. The histological and immunohistochemical characteristics of this tumor type are specific and starkly different from NSCC, resulting in an aggressive entity with advanced local invasion. Conventional chemotherapy did not show satisfactory results, and future studies are needed to explore the molecular profile of these tumors in order to determine the best therapeutic approach. The aggressive nature of his disease and poor response to treatment is known with PSC. Ultimate 5 year survival is ~25%. By presenting this case with its overall clinical course, the data gathered can further add to the body of knowledge of this rare disease and aid in the development of successful treatment.

### Learning Objectives

1. Describe and discuss the various diagnostic strategies in identifying PSC
2. Demonstrate an appreciation to the complexity in management of PSC

## Unusual Presentation of Hyponatremia: Is it Water, is it medications, is it both or more.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

Case reports on multifactorial causes and atypical presentations of hyponatremia are infrequent. We present a case of multifactorial hyponatremia in a middle aged gentleman presenting with neurological deficits.

#### Case Presentation

A 55 year old Caucasian man with history of alcohol abuse, Hypertension and Type 2 Diabetes Mellitus presented with one day history of multiple falls, altered mentation, slurred speech and unilateral weakness. Patient drinks 4-6 beers/day and has recently been consuming around 2 gallons of water/day. Home medications were Hydrochlorothiazide, Lisinopril, Nifedipine, Dapagliflozin and Venlafaxine.

Patient was afebrile, pulse 95/min, blood pressure 112/54 mmHg, respiratory rate 22/min and O2 saturation 97% on room air.

On examination patient was euvolemic, encephalopathic with slurred incoherent speech. Rest of the exam was benign.

Labs were significant for Sodium(Na) 108 (UrineNa13), chloride 69, glucose 127, Osmolality 218 (Urine Osmolality 374), Cortisol 19, Thyroid Stimulating Hormone 1.3, Creatinine 1.2 (UrineCr 65.8), Blood urea nitrogen 27, Serum alcohol <10. Computer tomography Angiogram Head and neck and Electro-encephalogram(EEG) were unrevealing.

#### Diagnosis

Differentials for his neurological manifestations included Cerebrovascular-accident (CVA), seizure, Hyponatremia, infectious/metabolic encephalopathy and alcohol withdrawal.

CVA was ruled out, EEG for epileptiform discharges and infectious workup were negative. Signs and sympathetic symptoms of alcohol withdrawal were absent. Uremia, Hyperammonemia or carbon-dioxide narcosis were ruled out.

Hyponatremia workup revealed a conflicting picture with low Urine Na suggestive of polydipsia or Thiazide induced Hyponatremia but the High Urine Osmolality suggestive of Syndrome of Inappropriate ADH (SIADH) (table 1).

This patient had multiple contributory factors for hyponatremia including medications Venlafaxine (SNRI) and thiazide diuretics, poor nutrition and polydipsia.

#### Management

Venlafaxine and thiazide were discontinued. Hypertonic (3%) Saline was started until serum Na reached 121mmol/L which improved the confusion and focal neurological deficits. Mental status returned to baseline by day 4. The table shows trend in Sodium levels (fig.1).

**Learning Objectives**

1. Identify that Hyponatremia though is a common occurrence in elderly, it is important to consider the diagnosis and recognize its neurological manifestations in younger patients.
2. Implement an in-depth evaluation to diagnose a multifactorial etiology of hyponatremia where the routine algorithmic evaluation of hyponatremia utilizing the volume status and urine osmolality to ascertain one particular etiology might not be appropriate
3. Recognize that goal of treatment with Hypertonic saline is the resolution of acute neurological manifestations than a normalization of sodium levels

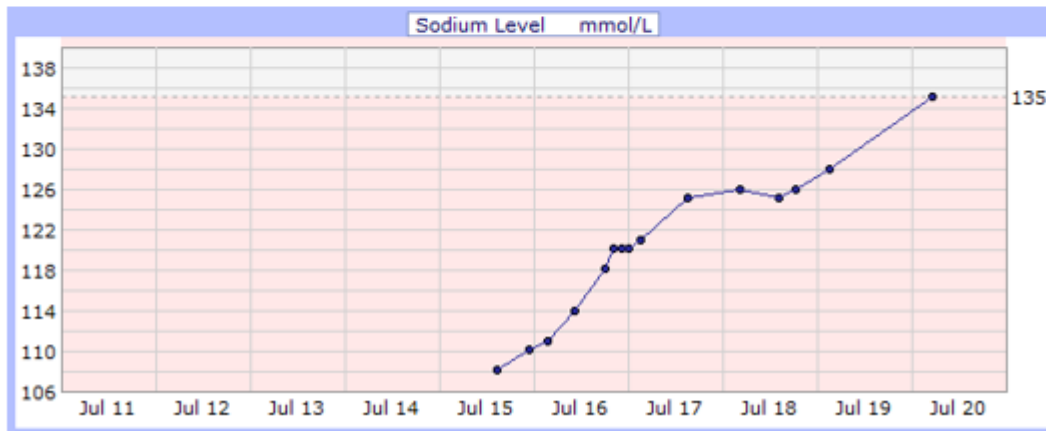
**Tables and/or Figures**

Table 1. Urine Sodium and Osmolality levels in Hyponatremia based on etiology

Hyponatremia Etiology	Urine Sodium (Na)	Urine Osmolality
Thiazide diuretic Induced*	< 25 ( Usually ranges close to 20)	> 100
Hypovolemia	< 25	< 100
SIADH*	> 40	> 100
Venlafaxine Induced*	> 40	> 100
Potomania*	< 10	< 100
Polydypsia*	< 10	< 100

\* Potential cause/contributor to the hyponatremia seen in our patient

Figure 1. Sodium trend during the hospitalization



## An Unfortunate Case of Complex Regional Pain Syndrome after Transradial Cardiac Catheterization: A Case Report

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Complex regional pain syndrome (CRPS) is a rare debilitating condition, of a neurological nature, affecting commonly the distal extremities bypassing dermatomal distributions. CRPS is characterized by pain out of proportion of the affected area with associated swelling, decreased range of motion (ROM), vasomotor involvement, and skin involvement, muscle wasting, and contractures.

**Case Presentation:** This is the case of a 55-year-old female with past medical history of hypertension who underwent cardiac catheterization on 11/18/2019 after presenting symptoms of intermittent pressure-like chest pain upon exertion, radiating to the left arm with an abnormal ECG. Six weeks status-post (s/p) trans-radial cardiac catheterization, patient returned to the hospital with gradual onset and progressive lateral shoulder and medial forearm pain, and hypersensitivity since the procedure. Physical exam showed tenderness over the right shoulder, limited ROM on shoulder abduction, elbow pronation, and hand dorsiflexion. Contraction of second, third, and fourth digits on right hand was present. Patient experienced allodynia in right upper lateral shoulder and medial forearm. She had negative venous doppler ultrasound, wrist x-ray, and MRI of right shoulder unremarkable for nerve compression. Differential diagnoses were osteoarthritis, radiculopathy, brachial plexopathy, deep vein thrombosis, all which were ruled out by imaging.

**Final Diagnosis:** Due to clinical presentation and negative imaging, the diagnosis of CRPS was made.

**Management and Outcome:** Patient was given pain management with anti-inflammatory, nerve pain medications and opioid. Occupational Therapy was limited, and a splint was recommended to prevent contracture. A Stellate ganglion block was performed without improvement. Early intervention has shown to improve the outcome and decrease disability. With only five reported cases of CRPS s/p trans-radial cardiac catheterization as of 2019, early diagnosis is important for prompt management. As in this case, a six-week delay in intervention had a detrimental effect on patient's prognosis, likely resulting in long-term disability.

### Learning Objectives

Upon completion of this lecture, learners should be better prepared to:

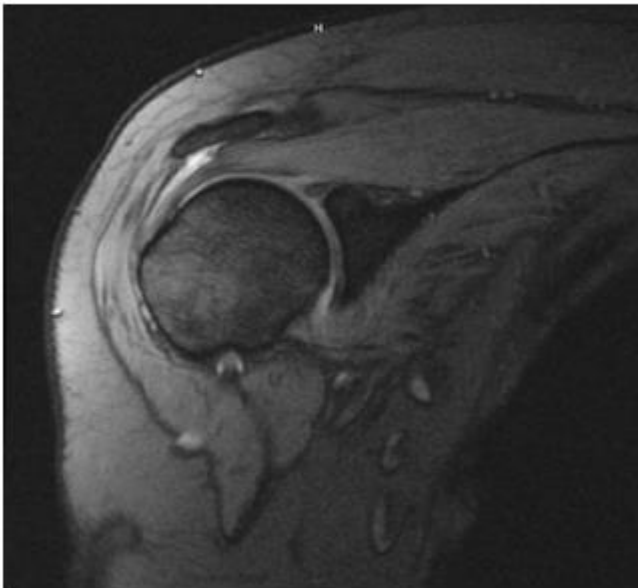
1. Describe the clinical presentation of Complex Regional Pain Syndrome and identify one uncommon etiology.
2. Discuss the importance of early diagnosis and treatment to prevent potential disability.

Tables and/or Figures

Fig. 1: X-ray of the wrist without evidence of acute fracture or dislocation.



Fig. 2: MRI of the right shoulder showing partial non-full thickness tear of the subscapularis tendon.



## Rare Cause of Thrombocytopenia in Appalachia involving a point mutation in the ANKRD26 gene

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### CASE PRESENTATION

A 65 yo female with chronic fatigue syndrome was referred for workup of low platelets, presumed to be from Idiopathic Thrombocytopenic Purpura. Family history was significant for clinical bleeding diathesis with thrombocytopenia in patient's child, twin sister, nieces from sister, and two of the niece's children. Family pedigree suggested a non-X-linked Autosomal Dominant inheritance. Initial bone marrow biopsy in 2012 was normal. Work-up showed negative ANA, hepatitis panel, Helicobacter pylori and for autoimmune diseases and no paraproteinemia. Wiskott Aldrich syndrome gene analysis was negative and abdominal ultrasound showed no hepatosplenomegaly. Peripheral smear showed normal sized platelets, no clumping and no blasts. Repeat bone marrow biopsy showed normocellular bone marrow with trilineage hematopoiesis; normal female karyotype; FISH negative for myelodysplastic syndrome mutations. Patient was unresponsive to a trial of prednisone. Eventually, genetic testing revealed heterozygosity in ANKRD26c.-126T>C, consistent with Nonsyndromic Thrombocytopenia (THC2).

#### IMPACT/DISCUSSION

Thrombocytopenia, defined as having a platelet count of less than  $150 \times 10^3$  per  $\mu\text{L}$ , is a commonly encountered problem in medical practice.<sup>5</sup> Differential causes for thrombocytopenia include; decreased production, increased consumption, or sequestration.<sup>6</sup> ANKRD26 is a gene mutation that causes Autosomal Dominant Nonsyndromic Thrombocytopenia (THC2), and is associated with mild bleeding tendencies along with mild to severe thrombocytopenia.<sup>1</sup> The point mutation in ANKRD26 is thought to alter the binding of key transcription factors, resulting in abnormal signal transduction which adversely affects platelet formation, and also indirectly affects other signal transduction pathways which may increase the risk of myeloid precursor transformation.<sup>4</sup> There are 21 known families affected with this syndrome worldwide.<sup>1</sup>

#### CONCLUSION

ANKRD26/ THC2 is identified by mild to severe thrombocytopenia with normal platelet size and no phenotypic complications.<sup>4</sup>

The predominating theory regarding thrombocytopenia in ANKRD26 mutations is dysregulation of pathways which affect platelet formation.<sup>2</sup>

The ability to recognize this disorder is important for proper management and surveillance of the affected population. Incorrect diagnosis and anchoring bias during evaluation can lead to unnecessary and potentially harmful treatments such as chronic steroids and/or splenectomy.<sup>4</sup>

Patients with this syndrome may need surveillance by annual blood counts for early detection of myeloid neoplasms as they are at increased risk for developing acute leukemias.<sup>4</sup>

#### Learning Objectives

Differentials for thrombocytopenia  
Importance of identifying anchoring bias



### References and Resources

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## An Uncommon Bacteria Causing Septic Arthritis: Streptococcus Agalactiae

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

Septic arthritis is an orthopedic emergency requiring intervention to prevent joint and bone destruction. The most commonly identified organism causing septic arthritis is *Staphylococcus aureus*, followed by *Streptococcus pyogenes*. Risk factors for septic arthritis in adults include >50 years of age, joint disease, joint prosthesis, immunosuppression, diabetes mellitus, and skin infections. Group B streptococcus (GBS) or *Streptococcus agalactiae* is an uncommon pathogen of septic arthritis. GBS is known for colonizing vaginal flora and causing neonatal infections. There have been cases reported of septic arthritis secondary to GBS after a patient experienced trauma to the vagina from a pelvic exam or giving birth. This report presents a unique case of septic arthritis caused by GBS in a patient without history of vaginal or shoulder trauma.

#### Case Presentation

##### History:

A 56-year-old woman with a past medical history of type 2 diabetes mellitus was transferred from an outside hospital due to septic arthritis of the right shoulder and for work up for an NSTEMI.

Prior to admission, the patient had right shoulder pain for two weeks. The patient denied any recent trauma to the right shoulder or breaks in skin overlying the right shoulder. She did report that her dog scratched her left medial thigh causing her to bleed a month prior to presentation. The scratch had since healed, leaving a scar. Her past medical history includes type 2 diabetes mellitus, hypertension, coronary artery disease requiring stent placement, and hyperlipidemia. She had a urinary tract infection a few days prior to presenting the emergency department. The patient had not had a pelvic exam or pap smear for the past few years. The patient had a cholecystectomy one month before presenting to the emergency department. Her family medical history was non-contributory. She denied tobacco, alcohol, and illicit drug use.

She was administered a cortisone shot for pain relief. Two days afterwards, the patient presented to an emergency department with altered mental status, vomiting, and weakness. Her blood glucose was 604, and she was admitted to the hospital for diabetic ketoacidosis. She was also diagnosed with NSTEMI, as troponin was 0.24 and ECG showed nonspecific ischemic changes. After resolution of her DKA, the patient had a left heart catheterization performed, which showed multivessel coronary artery disease.

Upon evaluation of continued right shoulder pain, a CT scan was obtained revealing prominent gas and air collections with surrounding inflammation at the superior and anterior aspect of the humeral head and proximal humerus. Additionally, there was an extensive abscess involving the short and long heads of the biceps muscles, the deltoid muscle, subacromial space, and subcoracoid space. Follow-up MRI found numerous intramuscular abscesses throughout the right shoulder girdle musculature, extending to involve the biceps and triceps muscles. Two drains were placed into the right shoulder to drain the abscess and the patient was empirically started on vancomycin and piperacillin-tazobactam. She was then transferred to our facility for higher level of care.

##### Physical Exam:

On examination, the patient was alert and oriented, and in no acute distress. The temperature was 97.8 F, heart rate 75 beats per minute, the respiratory rate 17 breaths per minute, the blood pressure 123/81 mm Hg, and the oxygen saturation 97% while breathing on room air. Her right shoulder had 2 catheters draining clear, yellow fluid. There was no erythema,

warmth, or induration. Upon palpation of the right shoulder, mild tenderness was present. Significant edema extended from her fingertips to her bicep. Range of motion of the right shoulder was limited due to pain.

Laboratory Values:

The patient's BMP, CBC, CRP, and ESR can be seen in the table below.

- Hemoglobin 10.8
- Hematocrit 33.8
- Platelet 221
- WBC 11.6
- Differential Count %
  - o Neutrophils 82
  - o Lymphocytes 7
  - o Monocytes 8
  - o Eosinophils 1
  - o Basophils 0
- Na 135
- K 3.5
- Cl 102
- HCO3 28
- BUN 11
- Cr 0.6
- Glucose 153
- CRP 6.56
- ESR 67

Tests and Results:

A transesophageal echocardiogram was negative. The patient was evaluated by cardiology and found to be stable and no further cardiac intervention was needed at this time. From the previous hospital, blood cultures were negative and the cultures from the drains were positive for GBS. Urine culture from her prior diagnosis of UTI was positive for *Klebsiella pneumoniae*. Repeat blood cultures were negative, and the repeat drain culture was also positive for GBS. A right shoulder CT scan showed septic bursitis and arthritis with abscesses, which was consistent with the patient's prior imaging. Sensitivities for the cultures resulted that the organism was sensitive to penicillin.

Final Diagnosis: Septic arthritis of the right shoulder secondary to GBS

Management/Outcome:

Vancomycin and piperacillin-tazobactam were discontinued and the patient was started on a continuous infusion of penicillin. The patient's shoulder did not improve after several days of antibiotics. Orthopedics performed an incision and drainage of the right shoulder to evacuate the abscess. Eight days following the procedure, the patient had an additional incision and drainage due to failure of improvement of symptoms. Her symptoms gradually improved the days following the repeat procedure. The patient's antibiotic was switched from penicillin to ceftriaxone for ease of drug administration once the patient was discharged from the hospital. Outpatient antibiotic administration was arranged for the patient for an additional 6 weeks.

Discussion

The patient's diagnosis of septic arthritis secondary to GBS is not typical. Although the patient had a risk factor of diabetes mellitus, there was no associated trauma to the right shoulder that resulted in breaks to her skin. Potential sources of infection may have been her urinary tract infection, cholecystectomy, and dog scratch wound. The urinary tract infection is a less likely source because the urine culture was positive for *Klebsiella*, not GBS. The cholecystectomy is a possible source of infection because of the surgical incision. The dog scratch wound may have been the site of entry because of its proximity to the vagina. Some cases of pyogenic arthritis due to GBS have been associated with concomitant infection, such as positive blood cultures. This patient's blood cultures were consistently negative.

The patient did have a cortisone shot to the right shoulder, but the patient had symptoms 2 weeks prior to its administration. In addition, the patient did not have any recent vaginal trauma secondary to a pelvic exam or childbirth, which are other potential sources of infection. Additionally, the patient does not have a history of joint disease or joint prostheses that would increase her susceptibility to this type of infection.

Although the source of infection for this patient is impossible to determine, there is a concern for the rising number of cases of septic arthritis of native joints secondary to GBS. This particular case brings to attention that there are unsuspected sources of GBS colonization. The patient did not have prosthetic joints and did not have vaginal or pelvic trauma, which are major risk factors. Further investigation needs to be conducted to identify additional sources of GBS colonization that can cause serious infections in patients.

**Learning Objectives**

Describe the common risk factors of septic arthritis.

Identify the bacteria that often cause septic arthritis.

Discuss the complications of *Streptococcus agalactiae* infections.

## COVID-Toes: The Clinical Correlation between Chilblains and SARS-CoV-2

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Global Healthcare

### Abstract

The novel Coronavirus Disease 2019 (COVID-19) presents with a wide range of symptoms. These may include fever, pneumonia, headaches, sore throat, diarrhea, strokes, liver and kidney damage, loss of taste. Yet, the most bizarre documented presenting symptoms has been “COVID toes.” Overall, the fifteen studies conducted found that patients with dermatologic symptoms often displayed chilblain-like skin lesions, pernio-like, urticarial, macular erythema, vesicular, papulosquamous, and retiform purpura. Patients presenting with COVID toes, regardless of confirmatory COVID-19 laboratory results, demonstrated epidermal necrotic keratinocytes, dermal edema, perivascular and perieccrine sweat gland lymphocytic (CD3/4+) inflammation, vascular changes with endothelialitis, microthrombosis, fibrin deposition, and immune reactant deposits on vessels. Histopathological immunohistochemical and direct immunofluorescence from biopsy showed IgM deposits in most of the cases. Patient symptoms varied in severity from milder pernio-like lesions to progressive retiform purpura. These findings could aid in triaging patients with COVID toes. This may prevent the progression to the known neurologic and destabilizing thrombotic events seen in many COVID-19. In patients with lesions, early identification and intervention with antivirals, antiplatelets, and anticoagulants to prevent hypoxia and reperfusion injuries may be avoided. Dermatological features are often overlooked; distinct clinical signs of COVID-19 and further awareness and research are indicated.

### Learning Objectives

Triage COVID-19 patients based on visual dermatologic symptoms and flatten the curve to increase positive results and prevent disease progression in SARS-CoV-2 patients.

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## Emergency Department-based Interventions Affecting Social Determinants of Health in the United States: a Scoping Review

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Public Health & Environmental Medicine

### Abstract

**Background:** Social determinants of health (SDOH) have significant implications for health outcomes in the United States. Emergency medicine functions as the safety net of the American healthcare system, caring for our nation's most vulnerable populations. In recent years, Social Emergency Medicine, a field that aims to assess and address healthcare disparities as they impact patients seeking emergency department care, has emerged.

**Objective:** We sought to summarize and categorize the peer-reviewed literature to identify ED-based interventions to mitigate the SDOH.

**Methods:** We conducted a scoping review to identify and characterize articles that report the impact of interventions that address SDOH in the emergency care setting. In collaboration with a medical librarian, we designed and conducted a search strategy in the Medline, CINAHL, and Cochrane CENTRAL databases. We also conducted a "pearl growing" search in PubMed for articles similar to 13 highly relevant citations identified before and during the screening process. Abstracts were reviewed independently and in duplicate by two reviewers to identify potentially relevant articles for inclusion. Full manuscripts were obtained to assess eligibility criteria for inclusion. Included articles were categorized by primary SDOH category and summarized.

**Results:** A total of 10,856 abstracts were identified. Following removal of duplicates, 10,358 abstracts were reviewed. Five hundred ninety-six potentially relevant studies were identified. Review of the full manuscripts identified 138 articles for inclusion. These articles were further subdivided into seven SDOH domains: 1) language/literacy/health literacy; 2) access to care; 3) exposure to violence; 4) food insecurity; 5) housing issues/homelessness; 6) discrimination/group disparities; and 7) socioeconomic status/poverty

Conclusion: ED-based interventions that address seven different SDOH domains have been reported in the peer-reviewed literature. Systematic reviews are needed to further characterize interventions in each of these seven domains and to define a future research agenda.

**Learning Objectives**

- 1) With the emergence of Social Emergency Medicine, further research is needed to discern healthcare disparities and their effects on patient care in the Emergency Department.
  
- 2) Despite numerous recent publications, certain health disparities in the Emergency Department, including food and housing insecurity, are featured limitedly. This may limit our understanding of the impact or magnitude these disparities have on our patients.



## Acute Progressive Ascending Paralysis in a 2 Year Old Female

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<b>Disclosure Information</b>	Author has no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Public Health & Environmental Medicine

### Abstract

#### Introduction:

Tick paralysis is a rare disease characterized by ascending flaccid paralysis thought to be caused by a neurotoxin in tick saliva that typically resolves within 24 hours of tick removal. The American dog tick (*Dermacentor variabilis*) and Rocky Mountain wood tick (*Dermacentor andersoni*) are the two most common ticks associated with tick paralysis. The incidence of tick paralysis is difficult to determine as there is no national surveillance system, but a review of the literature suggests incidence is greater in the Western United States where most states still have an incidence of less than 1 case per year. The readily available treatment for this disease and the morbidity/mortality associated with a missed diagnosis make tick paralysis an important differential diagnosis for any child with acute ascending paralysis.

#### Case Presentation:

We report a 2-year-old Caucasian female with no previous medical history who presented with 1-day history of refusal to walk. Patient had no recent respiratory or gastrointestinal illness, sick contacts, or recent travel. Initial physical exam revealed abnormal gait with limp of left lower extremity and pain with movement of left ankle. Our initial differentials included septic joint, toxic synovitis, myositis, meningitis, encephalitis and possible lower extremity fracture. CBC, CMP, Respiratory Viral Panel, CRP, ESR, CPK, U/A, and GI panel were all within normal limits. X-ray bilateral lower extremities was negative. After initial improvement in activity level following intravenous fluids administration, the patient woke the next morning with increasing fussiness, along with decreased tone and reflexes in both lower extremities. She additionally began having difficulty speaking and swallowing. At this point, we were concerned about Guillain Barre syndrome and acute disseminated encephalomyelitis. MRI brain and cervical, thoracic, and lumbar spine were negative. CSF analysis with 5 WBCs, 0 RBCs, 20 protein, and 59 glucose. Urine culture and CSF culture negative. A thorough post procedure physical exam revealed a tick attached to the left posterior occipital scalp.

#### Final Diagnosis:

Tick borne paralysis

#### Outcome and Follow-up:

The patient steadily improved after removal of the tick. She regained all motor and cognitive function within 24 hours and was back to her neurological baseline. She was discharged home with close follow up with Neurology.

### Learning Objectives

1. Discuss epidemiology related to tick borne paralysis overall and incidence in Tennessee.
2. Describe presentation and progression of tick borne paralysis.

## The Association Between Vitamin D Deficiency and COVID-19 Severity in Prisma Health Patients

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Public Health & Environmental Medicine

### Abstract

**Background/Knowledge Gap:** The novel pandemic viral disease COVID-19, caused by the coronavirus Sars-CoV-2, causes extensive morbidity and mortality. As there is no proven treatment, the study of immunoprotective factors is critical. Vitamin D, is an essential vitamin with immunoprotective, anti-microbial, and anti-inflammatory properties. Vitamin D is thought to modulate components of the immunological surge associated with severe COVID-19. Thus, we hypothesize that vitamin D deficiency modulates the presentation, course, and outcome of COVID-19 patients.

**Methods/Design:** This retrospective cohort study examines the correlation between COVID-19 disease severity and historical vitamin D levels. The primary outcome is disease severity, quantified as the worst daily score from each patient's daily World Health Organization Clinical Progression Scale. This scale stratifies disease severity by factors such as hospitalization, need for supplemental oxygenation, laboratory values that reflect oxygen delivery, and use of physiological replacement technologies such as mechanical ventilation and dialysis. Secondary outcomes include the number of emergency department visits, Emergency Severity Index at presentation for ED patients, and length of stay. We will use historical vitamin D levels obtained in the 3 years before COVID-19 testing to identify probable vitamin D deficiency and insufficiency. We will use multivariable logistic and linear regression models to analyze retrospective data abstracted from the Prisma Health Rapid Innovation Task Force COVID-19 Registry to control for age, race, sex, smoking history, comorbidities, and presentation site as well as seasonality of prior vitamin D testing.

**Conclusions/Implications:** We propose that optimizing vitamin D levels will improve patient outcomes, particularly in the underserved communities most likely to suffer vitamin D deficiency. This pivotal research will clarify the effect of vitamin D

deficiency on COVID-19 disease severity, establish a foundation for further study of vitamin D supplementation in COVID-19 patients, and advance understanding of the pandemic disease COVID-19.

**Learning Objectives**

Learning Objective 1: Upon completion of this lecture, learners should be better prepared to: Describe the association between vitamin D deficiency and COVID-19 disease severity.

Learning Objective 2: Upon completion of this lecture, learners should be better prepared to: Expand our understanding of the host-level factors that contribute to COVID-19 severity.

Learning Objective 3: Upon completion of this lecture, learners should be better prepared to: Identify opportunities for further research that target improving outcomes for medically underserved communities that are more likely to suffer from Vitamin D deficiency and worse COVID-19 outcomes.

## Hepatitis C Screening Disparities in America's Opioid Capital: What Do We Have to Learn?

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Public Health & Environmental Medicine

### Abstract

**Background:** Hepatitis C (HCV) disproportionately affects minority populations(1). In order to identify other health disparity gaps and improve testing guidelines, we examined the Wilmington, NC area - ranking #1 nationally in opioid abuse with greater than 11.6% of its population misusing prescription opioids(2). Coinciding with this is an impressive rate of HCV making it a magnified model for the rest of America(3). Our goal for this study was to identify disparities in HCV screening based on patient demographics, and to create a model predicting who are most likely to test positive.

**Methods:** This was a retrospective observational study of randomly selected patients in a rural community hospital system. Patients were categorized by sex, age, primary language, access to a primary care provider (PCP), history of intravenous (IV) drug use, insurance payor, 2017 adjusted gross income for their zip code, and HCV infection status. An optimal model was created using a forward-selection approach to provide the minimum Akaike information criterion. Predictive capabilities of each formulated equation were tested through five-fold cross validation.

**Results:** 10,000 patients were included, half were screened for HCV, and 601 were HCV positive. Negative predictors for HCV screening were being male (log odds - 0.426,  $p < 0.01$ ) and age 25-44 (log odds - 0.379,  $p < 0.01$ ). The strongest positive predictors for screening, besides IV drug use, were English as primary language (log odds 0.818,  $p < 0.01$ ) and access to a PCP (log odds 0.778,  $p < 0.01$ ). Lack of health insurance/self-pay was not a predictor. For the HCV infection model (sensitivity 43.48%, specificity 94.07%), the prototype most likely to be HCV positive was an age 25-44 (log odds 1.394,  $p < 0.01$ ), male (log odds 0.922,  $p < 0.01$ ), English speaker (log odds 1.627,  $p < 0.01$ ), with a history of IV drug use (log odds 2.106,  $p < 0.01$ ), and government insurance (log odds 2.108,  $p < 0.01$ ). Increases in adjusted gross income were associated with decreases in the log-odds of HCV infection ( $p < 0.01$ ).

**Conclusions:** Males age 25-44 were the least likely to be screened for HCV and most likely to test positive. Attention should also be brought to non-English speakers and those without a PCP to close health disparity gaps. Lack of health insurance was not a screening barrier, but socioeconomic inequalities were seen by lower infection rates in higher income areas and increased likelihood of infection in those without private insurance. Despite the high specificity of these models, other factors need to be explored for better sensitivity.

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### Learning Objectives

1. Discuss current healthcare disparities in hepatitis C screening.
2. Cite current USPSTF hepatitis C screening guidelines.

Tables and/or Figures

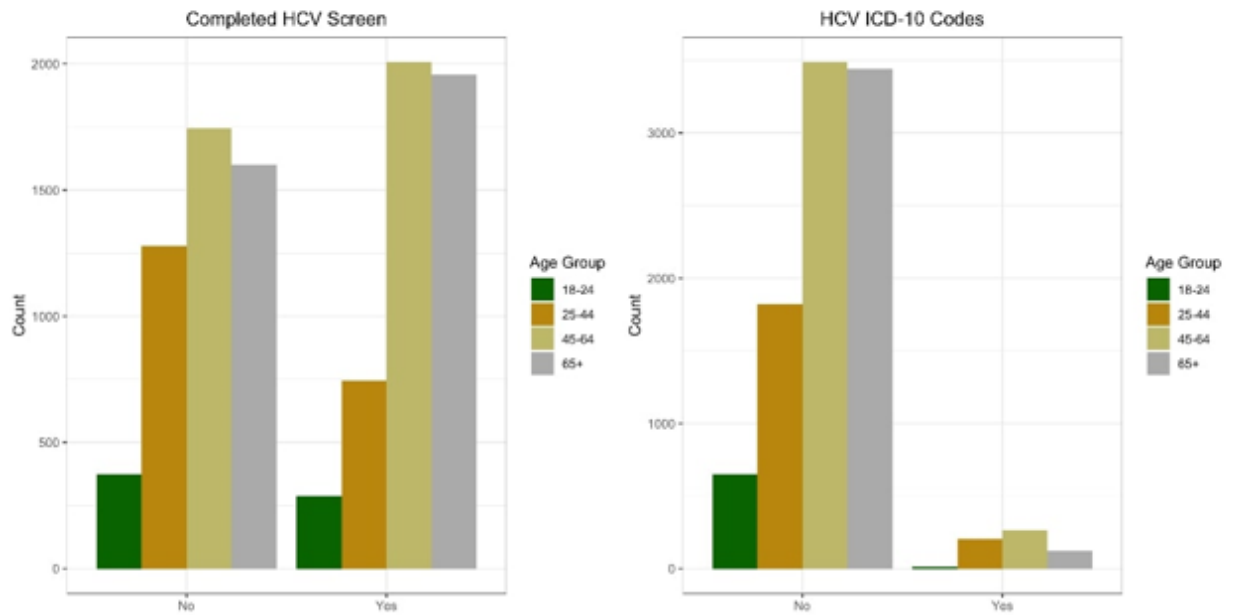


Figure 1 (left): Distribution of HCV screens by age group. Figure 2 (right): Distribution of HCV infections by age group.

Table 3. Logistic Regression Results – Screening.

	<i>Dependent Variable: HCV Screen Completed</i>							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Age_25-44	-0.446*** (0.092)	-0.422*** (0.093)	-0.415*** (0.093)	-0.418*** (0.093)	-0.421*** (0.093)	-0.366*** (0.093)	-0.404*** (0.094)	-0.379*** (0.095)
Age_45-64	0.333*** (0.087)	0.424*** (0.087)	0.422*** (0.088)	0.415*** (0.088)	0.415*** (0.088)	0.449*** (0.088)	0.394*** (0.089)	0.431*** (0.090)
Age_65+	0.382*** (0.087)	0.486*** (0.088)	0.481*** (0.088)	0.464*** (0.088)	0.464*** (0.088)	0.456*** (0.088)	0.448*** (0.091)	0.456*** (0.092)
Gender		-0.430*** (0.042)	-0.430*** (0.042)	-0.429*** (0.042)	-0.429*** (0.042)	-0.405*** (0.043)	-0.429*** (0.043)	-0.426*** (0.044)
Language			-0.607*** (0.187)	0.604*** (0.188)	0.602*** (0.188)	0.660*** (0.187)	0.789*** (0.189)	0.818*** (0.191)
Access to PCP				0.707*** (0.105)	0.708*** (0.105)	0.737*** (0.107)	0.778*** (0.107)	0.778*** (0.108)
Hist IV Drug Use					0.486 (0.522)	1.254** (0.576)	1.264** (0.574)	1.286** (0.577)
HCV w/o Coma						-1.885*** (0.168)	-1.845*** (0.170)	-1.828*** (0.170)
<u>Ins_Government</u>							0.205** (0.096)	0.265*** (0.097)
<u>Ins_Other</u>							0.590*** (0.199)	0.693*** (0.201)
<u>Ins_Private</u>							0.358*** (0.092)	0.373*** (0.093)
<u>Ins_Self.Pay</u>							0.681*** (0.089)	0.716*** (0.091)
AGI								0.000*** (0.000)
Constant	-0.169** (0.080)	-0.073 (0.081)	-0.672*** (0.202)	-0.689*** (0.202)	-0.688*** (0.202)	-0.730*** (0.202)	-1.247*** (0.218)	-1.752*** (0.225)
Observations	10,000	10,000	10,000	10,000	10,000	10,000	10,000	9,931
Log-Likelihood	-6,801.65	-6,749.35	-6,743.79	-6,719.84	-6,719.42	-6,628.35	-6,568.16	-6,454.31
AIC	13,611.30	13,508.70	13,499.60	13,453.70	13,454.80	13,274.70	13,162.30	12,936.60

Note: Standard errors are in parentheses. \*, \*\*, and \*\*\* represent statistical significance at the 10%, 5%, and 1% levels, respectively. We include one additional variable in each subsequent model to determine the marginal improvements to the AIC that each variable provides. Through unreported analyses, we find the variables *Race*, *Chronic Viral Hepatitis*, and *Unspecified HCV with Coma* do not consistently increase model strength. It should be noted the coefficient for AGI (i.e., 0.000003) is small because the data for the variable includes very large numbers.

Table 4. Logistic Regression Results – Infection.

	<i>Dependent Variable: Positive HCV Infection</i>					
	(1)	(2)	(3)	(4)	(5)	(6)
Age_25-44	1.550*** (0.280)	1.495*** (0.281)	1.511*** (0.281)	1.473*** (0.281)	1.421*** (0.285)	1.394*** (0.286)
Age_45-64	1.219*** (0.278)	1.024*** (0.279)	1.018*** (0.279)	1.017*** (0.279)	0.983*** (0.283)	0.956*** (0.283)
Age_65+	0.418 (0.286)	0.189 (0.287)	0.178 (0.287)	0.176 (0.287)	-0.348 (0.293)	-0.325 (0.294)
Gender		0.921*** (0.088)	0.925*** (0.088)	0.932*** (0.088)	0.935*** (0.091)	0.922*** (0.091)
Language			2.473** (1.006)	2.451** (1.006)	2.683*** (1.018)	1.627*** (1.016)
Hist IV Drug Use				2.484*** (0.0534)	2.099*** (0.540)	2.106*** (0.545)
<u>Ins_Government</u>					2.171*** (0.274)	2.108*** (0.275)
<u>Ins_Other</u>					2.876*** (0.323)	2.815*** (0.325)
<u>Ins_Private</u>					0.685** (0.282)	0.671** (0.283)
<u>Ins_Self-Pay</u>					0.844*** (0.274)	0.820*** (0.275)
AGI						-0.000*** (0.000)
Constant	-3.783*** (0.270)	-4.073*** (0.273)	-6.532*** (1.041)	-6.512*** (1.041)	-7.863*** (1.086)	-7.398*** (1.086)
Observations	10,000	10,000	10,000	10,000	10,000	9,931
Log-Likelihood	-2,209.87	-2,153.30	-2,145.57	-2,136.16	-1,990.34	-1,964.79
AIC	4,427.74	4,316.59	4,303.13	4,286.31	4,002.67	3,953.57

Note: Standard errors are in parentheses. \*, \*\*, and \*\*\* represent statistical significance at the 10%, 5%, and 1% levels, respectively. We include one additional variable in each subsequent model to determine the marginal improvements to the AIC that each variable provides. Through unreported analyses, we find the variables *Race*, *Chronic Viral Hepatitis C*, *Access to Primary Care Provider*, *Unspecified HCV without Coma*, and *Unspecified HCV with Coma* do not consistently increase model strength. It should be noted the coefficient for AGI (i.e., -0.000003) is small because the data for the variable includes very large numbers.

## Improving Hypertension and Diabetes mellitus control by a multidisciplinary approach at BHCC.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Quality Health Care, Patient Safety & Best Practices

### Abstract

Background: Hypertension and Diabetes mellitus are two chronic diseases that have a tremendous healthcare impact associated to social determinants. Diabetes mellitus affects at least 34 million Americans in 2020, according to the National Diabetes Statistics Report of 2020 and the National Health and Nutrition Examination Survey of 2018. Both Hypertension and Diabetes are risk factors for Cardiovascular Disease (CVD). Lowering blood pressure and controlling serum glucose levels can decrease the incidence of Stroke, Myocardial Infarction (MI), Heart Failure (HF), Chronic Kidney Disease (CKD), and microangiopathies, such as retinal microangiopathy leading to blindness. Many complications can arise from uncontrolled Hypertension and Diabetes, and the main objective of this project is to prevent these complications by improving control through a multidisciplinary approach that include primary care physician (PCP), Nutritionist/dietitian, Clinical pharmacist, Podiatrist, and Behavioral Health support (Patient Care Team). Recommendations and definitions provided by different guidelines, such as the Eight Joint National Committee (JNC-8), American Heart Association (AHA), American Diabetes Association (ADA) were analyzed and followed to design this community project. The Uniform Data System (UDS) of Health Resources and Services Administration (HRSA) is used as a guidance for the establishment of statistical terms, formulas, and threshold values.

Methods/Design: Borinquen Health Care Center (BHCC) is FQHC, PCMH NCQA & AAAHC Accredited, with multiple sites that serving over 44,000 patients (UDS2019) with diverse, multicultural, low income characteristics. BHCC has been implementing actions and updating protocols according to the JNC8, AHA, ADA guidelines to manage Hypertension and Diabetes mellitus. The healthcare providers have been trained on recommended therapeutic options to treat Hypertension and Diabetes mellitus.

As of December 31st, 2019, a total of 3540 patients diagnosed with Essential Hypertension, and 1537 patients with Diabetes mellitus were included in the project. All the existing and newly diagnosed patients are including in the pool of patients throughout 2020, and preliminary quarterly results will be analyzed.

Because patients with both uncontrolled Hypertension and Diabetes mellitus are at a higher risk of developing CVD and deleterious outcomes, stratification of these patients into low-risk and high-risk groups was necessary. On site fundoscopic eye exams have been used as a surrogate ophthalmological exam, to detect patients with retinal complications of Hypertension and/or Diabetes. The high-risk group (e.g. patient with both Hypertension and Diabetes) required focused multidisciplinary attention to attain a satisfactory control of their arterial blood pressure, and serum Glucose level through surrogate measurement of their Hemoglobin A1C

The cut-off levels chosen to determine status of “controlled” and “poorly controlled” are given by the US Department of Health and Human Services – Health Resources and Services Administration (HRSA), as follows:

The objective of the project is achieving a control rate of 75% for Hypertension and 80% for Diabetes mellitus by December 31st, 2020 by addressing the following goals:

- By December 31st, 2020, increase control rate of Hypertension (BP < 140/90 mmHg) from 50% (UDS 2019) to 75%, for patients with active Hypertension (18-85 years);



- Increase the control rate of Diabetes mellitus (HbA1C  $\leq$  9%) from 55% (UDS 2019) to 80% for patients with active Diabetes mellitus (18-75 years);
- Increase patient education on nutrition and compliance to ambulatorial blood pressure monitoring and Hemoglobin A1c follow up in 25% of the non-complaint patients with both Diagnoses;
- Increase patient participation in decision making process to enhance medication adherence to Antidiabetic, Anti-hypertensive and Lipid-lowering agents, in 25% of the non-Complaint patients with both diagnoses.

#### Preliminary Results

The data was calculated using definitions provided by Uniform Data System (UDS) Resources of HRSA, and results are compiled as a monthly cumulative result depicted on Table 1, and as monthly non-cumulative trend depicted on Graph 1.

The total number of patients each month is to illustrate the burden of Hypertension and Diabetes in the BHCC community assigned to this project, which is summarized as semi-annual report on Table 2.

#### Results/Findings

Controlled Hypertension – Patients age 18 – 85 years:

Patients whose most recent blood pressure is adequately controlled during the measurement period - systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg during the measurement period.

Poorly controlled Diabetes mellitus patients age 18-75 years:

Hemoglobin A1C > 9% in the measurement period

(Conversely, “controlled” diabetes is considered HbA1C  $\leq$  9%)

Patients with both uncontrolled Hypertension and poorly controlled Diabetes mellitus are at a higher risk of CVD and they may benefit from a multidisciplinary holistic approach, based on patient education to increase access to care and medication adherence; nutrition counseling, smoking cessation and statin therapy compliance.

#### Graph 1.

Due to the novel COVID-19 pandemics, patient health management and follow-up have been negatively affected, despite the availability of Telehealth visits, starting in March 2020. Patients have reported more sedentarism and weight gain during this period, which could account for a decrease in the percentual cases of controlled Hypertension during the period of March – May 2020. Similarly, data shows that during the same period, there was a percentual decrease in controlled Diabetes cases. This could be a reflect of lower number of visits of diabetic patients, either presential, or via Telehealth. The goal of reporting data in a quarterly basis is to guide interventional strategies to achieve the community project goals.

Once negative impact of the COVID-19 pandemics starts declining, it is expected a further improvement in controlling Hypertension and Diabetes mellitus, as the trend of outpatient office visits, and daily physical activity by patients should increase, which will enable BHCC to continue efforts in patient and caregiver education to achieve the community project goals by December 31st, 2020.

#### Conclusions

The burden caused by Essential Hypertension and Diabetes mellitus is relevant, particularly when it comes to all potential complications that may arise. Nevertheless, as a starting point, patients have been encouraged to adhere to a strict control of their blood pressure and glucose levels, in order to prevent these latent complications. BHCC is not only committed to improving control of Hypertension and Diabetes for its patients, but also preventing the potentially lethal complications. The realization that only this multidisciplinary approach can achieve an adequate control of Hypertension and Diabetes, allows a crucial selection and allocation of appropriate existing resources, maximizing clinical and financial outcomes. A shift in the caregivers’ mindset and access to care management culture was a positive outcome observed from the implementation of this project. Despite the fact these benefits were not originally contemplated during this project design, not only patients have benefited from this holistic approach, but the organization, caregivers and the Healthcare system also draw numerous benefits from it.

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**Learning Objectives**

- To understand the challenges faced in the FQHC environment with Hypertension and Diabetes Management
- To identify areas of improvement in Chronic Disease Management
- To identify strategies to address Hypertension and Diabetes management in a patient centered model

**Tables and/or Figures**

**Preliminary Results**

The data was calculated using definitions provided by Uniform Data System (UDS) Resources of HRSA, and results are compiled as a monthly cumulative result depicted on Table 1, and as monthly non-cumulative trend depicted on Graph 1.

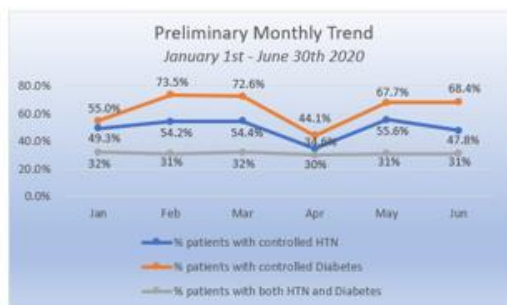
	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20
N patients with HTN*	1540	883	1538	2019	2097	2187	2305
N patients with uncontrolled HTN	1805	448	757	967	1018	1058	1151
<b>% patients with uncontrolled HTN</b>	<b>51.0%</b>	<b>50.7%</b>	<b>48.6%</b>	<b>47.9%</b>	<b>48.5%</b>	<b>48.4%</b>	<b>49.7%</b>
N patients with Diabetes Mellitus	1537	333	635	814	848	879	958
N patients with poorly controlled Diabetes	523	150	230	279	298	285	310
<b>% patients with poorly controlled Diabetes</b>	<b>34.0%</b>	<b>45.0%</b>	<b>36.2%</b>	<b>34.3%</b>	<b>35.1%</b>	<b>32.4%</b>	<b>32.4%</b>
N patients with both HTN and Diabetes	1043	280	487	638	629	680	738
<b>% patients with both HTN and Diabetes</b>	<b>29.5%</b>	<b>31.7%</b>	<b>31.6%</b>	<b>31.6%</b>	<b>30.0%</b>	<b>31.1%</b>	<b>31.2%</b>

\*HTN: Hypertension

The total number of patients each month is to illustrate the burden of Hypertension and Diabetes in the BHCC community assigned to this project, which is summarized as semi-annual report on Table 2.

**Table 2. Cumulative Semi-annual Report BHCC**

	Dec 19	Jun 20
<b>N patients age 18 - 85 years</b>	<b>17,255</b>	<b>11,690</b>
<b>Hypertension burden (%)</b>	<b>21%</b>	<b>20%</b>
<b>Diabetes mellitus burden (%)</b>	<b>9%</b>	<b>8%</b>



## Health Information Exchanges (HIE) at The University of Tennessee Medical Center Knoxville

<b>Presenting Author</b>	Devin John Clegg, MD, General Surgery Resident PGY1, Department of Surgery, University of Tennessee Medical Center, Knoxville, Tennessee
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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Quality Health Care, Patient Safety & Best Practices

### Abstract

**Background/Knowledge Gap:** Electronic Medical Records (EMR) have been implemented at UTMCK for almost 10 years in both the inpatient and outpatient ambulatory setting. Patients frequently seek medical care from systems outside of UTMCK and the sharing of medical information between systems can be inefficient. This study was undertaken in order to gauge knowledge and utilization of health information exchanges (HIEs) amongst the medical staff at UTMCK.

**Methods/Design:** An electronic tool was used to survey to 630 medical staff members at the University of Tennessee Medical Center, Knoxville. Medical providers were MD, DO, DPM, DMD, and DDS. The survey was distributed through email, and two additional email reminders were sent. The survey was cross sectional in design and used standard frequency and distribution statistics. The survey established prevalence and rates of respondents' answers. A Likert scale was used for "Ease of access" (1-5) responses.

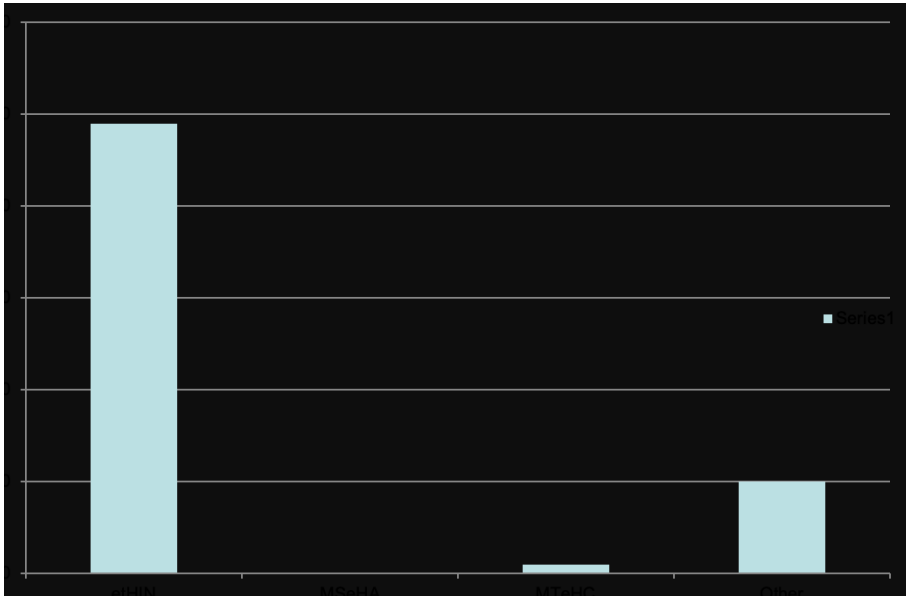
**Results/Findings:** Respondents included 97 of 630 (15%) initially surveyed. This included 68% males, with ages evenly distributed. Of those that responded, 70% have heard of health information exchanges (HIEs), with 47% of them finding HIEs helpful. Half of those that use HIEs, use East TN Health Information Network (etHIN). Users surveyed indicated that 37% utilize HIEs for front office staff access, 27% for resident access, and 25% have access for personal use. Most found access and navigation easy or moderately easy. Tutorials were requested for the providers (29%) and for office staff (36%) by respondents.

**Conclusions/Implications:** Most providers that responded at UTMCK have heard of HIEs, and etHIN is the most commonly used. Most providers delegate HIE access to their office staff or residents. Less than half of respondents found HIEs helpful. A minority of respondents wanted further education and training on HIE use.

### Learning Objectives

1. The audience will be able to describe the purpose of Health Information Exchanges (HIEs).
2. The audience will be able to discuss Health Information Exchange use at their own institution in comparison to UTMC.

Tables and/or Figures



## Viral and atypical respiratory co-infections in COVID-19: a systematic review and meta-analysis

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<b>Co-authors</b>	Steven Rothrock - MD, Emergency Medicine Physician - Dr. Phillips Hospital, Orlando Health, Orlando, FL
<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Quality Health Care, Patient Safety & Best Practices

### Abstract

#### Background/Knowledge Gap:

A novel coronavirus, now called SARS-CoV-2, was identified as the cause of pneumonia in a cluster of patients in Wuhan, China in December of 2019. Initially, experts including the Centers for Disease Control (CDC) and several state health departments recommended testing individuals with fever and lower respiratory tract infections for other viruses with instructions not to test for SARS-CoV-2 if alternate infections (eg, influenza) were present. More recently, experts have recommended that individuals who undergo testing for SARS-CoV-2 should additionally be tested for other common respiratory pathogens besides influenza. Respiratory co-infections have the potential to affect the diagnosis and treatment of COVID-19 patients. This meta-analysis was performed to analyze the prevalence of respiratory pathogens (viruses and atypical bacteria) in COVID-19 patients.

#### Methods/Design:

This review was consistent with Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA). Searched databases included: PubMed, EMBASE, Web of Science, Google Scholar, and grey literature. Studies with a series of SARS-CoV-2-positive patients with additional respiratory pathogen testing were included. Independently, 2 authors extracted data and assessed quality of evidence across all studies using Cochrane's Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology and within each study using the Newcastle Ottawa scale. Data extraction and quality assessment disagreements were settled by a third author. Pooled prevalence of co-infections was calculated using a random-effects model with univariate meta-regression performed to assess the effect of study subsets on heterogeneity. Publication bias was evaluated using funnel plot inspection, Begg's correlation, and Egger's test.

#### Results/Findings:

Eighteen retrospective cohorts and 1 prospective study were included. Pooling of data (1880 subjects) showed an 11.6% (95% confidence interval [CI] = 6.9–17.4, I<sup>2</sup> = 0.92) pooled prevalence of respiratory co-pathogens. Studies with 100% co-pathogen testing (1210 subjects) found a pooled prevalence of 16.8% (95% CI = 8.1–27.9, I<sup>2</sup> = 0.95) and studies using serum antibody tests (488 subjects) found a pooled prevalence of 26.8% (95%, CI = 7.9–51.9, I<sup>2</sup> = 0.97). Meta-regression found no moderators affecting heterogeneity.

#### Conclusions/Implications:

These results indicate that co-infections with both respiratory viruses and atypical bacteria are a common and potentially important factor in patients with COVID-19. The majority of individuals within included studies were symptomatic and were admitted to the hospital. It is possible that co-infection rates are higher in these patients and co-infection contributed to symptoms, disease severity, and hospitalization. Co-infection with other respiratory pathogens has important implications for diagnosis and prognosis. It is possible that the clinical presentation, laboratory results, radiological findings, and outcome differ between SARS-CoV-2 positive patients with and without co-infections. Pooled prevalence was 16.8% in studies that tested 100% of patients for co-pathogens. These results indicate that clinicians should not rely on positive tests for these co-infections when considering whether or not to test

patients for SARS-CoV-2. Further study is needed to determine if co-infections alter clinical features, laboratory and radiological examinations, and outcomes for patients with COVID-19.

**Learning Objectives**

Upon completion of this lecture, learners should be better prepared to approach the patient positive for COVID-19. Learners should be able to describe the implications of co-infection to their patients diagnosed with COVID-19. Learners should consider the likelihood of co-pathogen infection and how this may alter diagnosis and treatment.

## Providing Use and Awareness of Telemedicine during a Pandemic: Telemedicine Survey for Physicians, Residents and Patients

<b>Presenting Author</b>	Rony Shah, MD, Internal Medicine Resident PGY3, Department of Internal Medicine, Citrus Memorial Hospital, Inverness, Florida
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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Quality Health Care, Patient Safety & Best Practices

### Abstract

#### Background:

As millions of Americans are learning to embrace changes associated with coronavirus 2019 (COVID-19) pandemic it has become evident that current health care delivery has limitations. For many patients their only access to healthcare is an office visit. This structure contributes to the spread of the virus to uninfected patients who are seeking medical attention. It is critical that we do not refer patients to ED, urgent care centers, or physician offices without proper evaluation in an effort to reduce the risk of exposure of other patients or providers. To provide an effective alternative we need to focus on digital technology such as telemedicine which has been around for decades but underutilized. Heavy regulations for data protection and inadequate payment structure have prevented widespread telemedicine use. While we prepare for a COVID-19 surge expanding digital technology will allow physicians to safely improve health care delivery.

#### Study Design:

We designed a telemedicine survey and distributed it among attending physicians, resident physicians, and patients at our hospital to get a baseline understanding of their knowledge or awareness of telemedicine.

**Subject Selection:** For part one and two, the subject population was attending physicians and resident physicians at Citrus Memorial Hospital. For part three, the subject population was the patients of Citrus Internal Medicine Associates (IM residency outpatient clinic)

Three separate surveys were used in the study:

Part one and two (for Physicians and Residents) an anonymous survey was distributed via email to the attending physicians and resident physicians at Citrus Memorial Hospital (Inverness, FL)

Part three (for patients) an anonymous survey was distributed in the waiting room at Citrus Internal Medicine Associates (Inverness, FL) (Citrus Memorial Hospital IM residency outpatient clinic). This was an optional survey offered to patients at our outpatient clinic after they checked in for their appointment and were waiting to be taken to their examination room.

**Results:** See graphs attached below

#### Conclusion:

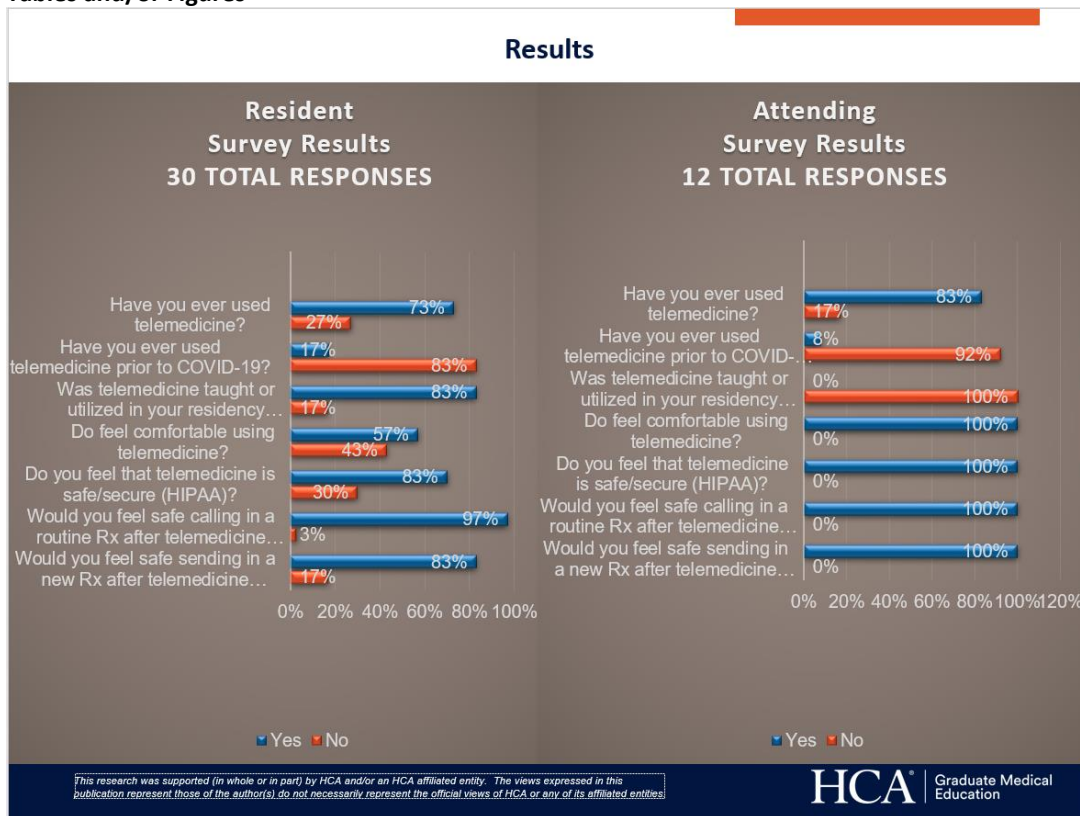
Patients reported little to no exposure with telemedicine prior to the COVID-19 pandemic. Majority of the physicians (residents and attendings) have no prior experience or training with tele-medicine even during residency prior to COVID-19. Physicians felt comfortable prescribing refills or new medications following a tele-medicine visit. The preferred method of communication between patients and physicians is video conferencing. Tele-medicine was underutilized prior to the COVID-19 pandemic but the comfort level is growing among physicians and patients, based on results a direct correlation exists between physician experience and comfort level with tele-medicine. The survey results show that

resident physicians, attending physicians, and patients believe there is a role for tele-medicine in patient care moving forward.

**Learning Objectives**

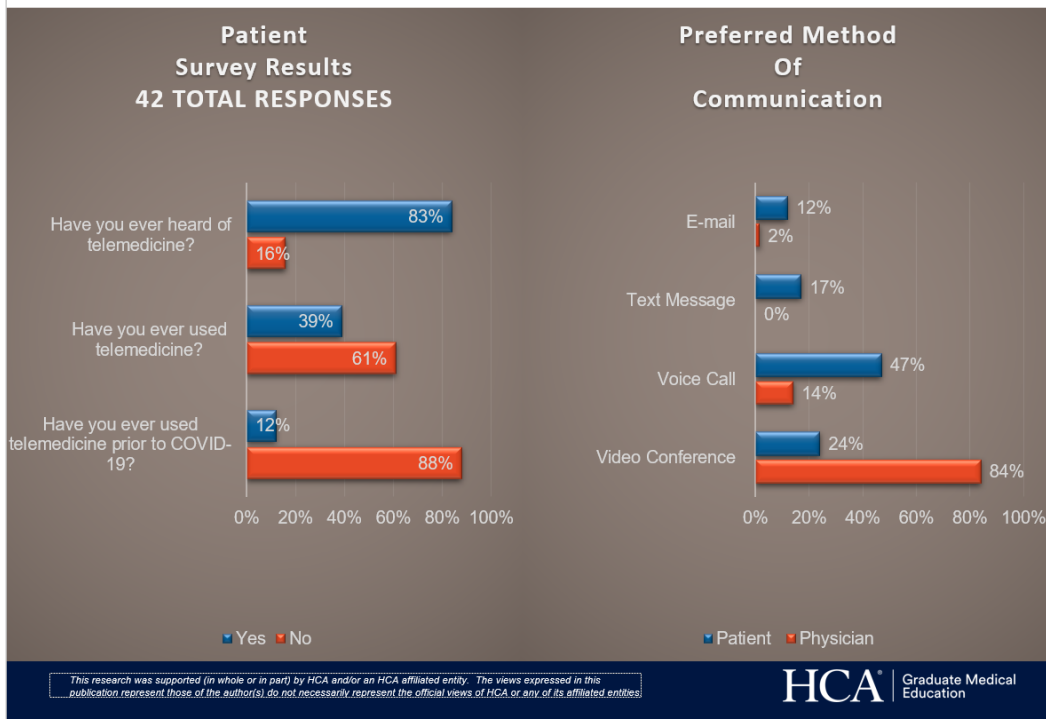
Our primary goal is to bring more awareness to the potential benefits of telemedicine for our patients and physicians in the community with this study. Secondary goal is to get a better understanding of patients and physicians exposure and experience with telemedicine. Another goal is to identify the features of telemedicine that patients and physicians are comfortable with.

**Tables and/or Figures**





## Results



## Transportation Barriers to Cancer Care Delivery: A Review.

<b>Presenting Author</b>	Sharanda Ruby Kirk, Bachelor of Arts, Medical Student, Brody School of Medicine-- Department of Surgical Oncology, Brody School of Medicine, Greenville, NC
<b>Co-authors</b>	Alexander A. Parikh, MD, MPH, Department of Surgery, Division of Surgical Oncology, Brody School of Medicine at East Carolina University, Greenville, NC; Rebecca A. Snyder, MD, MPH, Department of Surgery, Division of Surgical Oncology, Department of Public Health, Brody School of Medicine at East Carolina University, Greenville, NC
<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Quality Health Care, Patient Safety & Best Practices

### Abstract

**Background/Knowledge Gap:** Rural patients with cancer present with more advanced disease at diagnosis and experience worse survival compared to urban patients. Not only do patients living in rural regions face increased travel distance to care, but many also lack reliable access to transportation for cancer screening and treatment. However, the extent to which rural patients experience transportation barriers and the impact on clinical outcomes is not well understood. The purpose of this narrative review is to summarize the literature regarding travel distance and transportation barriers to care for rural patients in order to inform the design of future studies aimed to reduce rural-urban cancer disparities. Compared to the general population, patients residing in rural areas often must travel a significant distance (>60 miles) for specialized oncology care.

Minorities, those living in rural areas, and those residing in southern states were found to have approximately double the travel time to the nearest Cancer Center when compared to the overall U.S. population. Particularly, Hispanic and black populations were shown to have the least amount of access to cancer care facilities, both parent and satellite NCI cancer centers. The degree of cancer care specializations further increased travel time. This poses a great problem for minority patients in particular as they have reported transportation, finances, and insurance as significant sources of distress. Cancer care requires specialty surgical and medical resources that are less likely to be found in rural areas which further increases the urban-rural health disparity.

**Methods/Design:** The Transportation Barriers Measure is a well-established, validated measure of transportation barriers to access to healthcare within the urban setting, however, We have modified it based on previously published literature and preliminary data within the rural patient population of eastern North Carolina and included questions more specific to a rural setting. We used a focus group approach and interviewed 10 cancer patients at Vidant Health Center. The tool asks interview questions about means of transportation, difficulty arranging transportation, travel time, delayed or missed appointments due to travel time, cost of transportation, difficulties with public transportation, and difficulties with transportation to a pharmacy. We asked patients to listen to the new items that were added to ensure that they are delivered using easy to understand words that make sense to patients. We collected responses from each participant and made the appropriate revisions to the tool to ensure that each question was understandable and straight forward. The revised version of the measure will then be administered to 100 patients. Over the next six months, occurrences of missed, rescheduled, or canceled appointments (including new, follow-up, and treatment visits) will be recorded. When these events occur, the study coordinator will call the patient to identify and record the reason for the event to identify which occurrences were attributable to transportation barriers.

**Results/Findings:** **\*\*In progress\*\***, however, the goal is to combat transportation barriers in order to reduce rural-urban cancer disparities. This goal will be achieved by identification of patients that are considered high-risk for transportation barriers based on the Transportation Barriers Measure. These patients will be referred to a clinical navigation team comprised of social workers, nurse navigators, and lay navigators to provide the patient with eligible transportation-specific resources to reduce occurrences of missed, rescheduled, or canceled appointments.

Conclusions/Implications: **\*\*in progress\*\***

**Learning Objectives**

- Discuss the transportation barriers to care in rural cancer patients and how it may impact timeliness of care and prognosis of rural cancer patients
- Define transportation as a social determinant of health

**Tables and/or Figures**

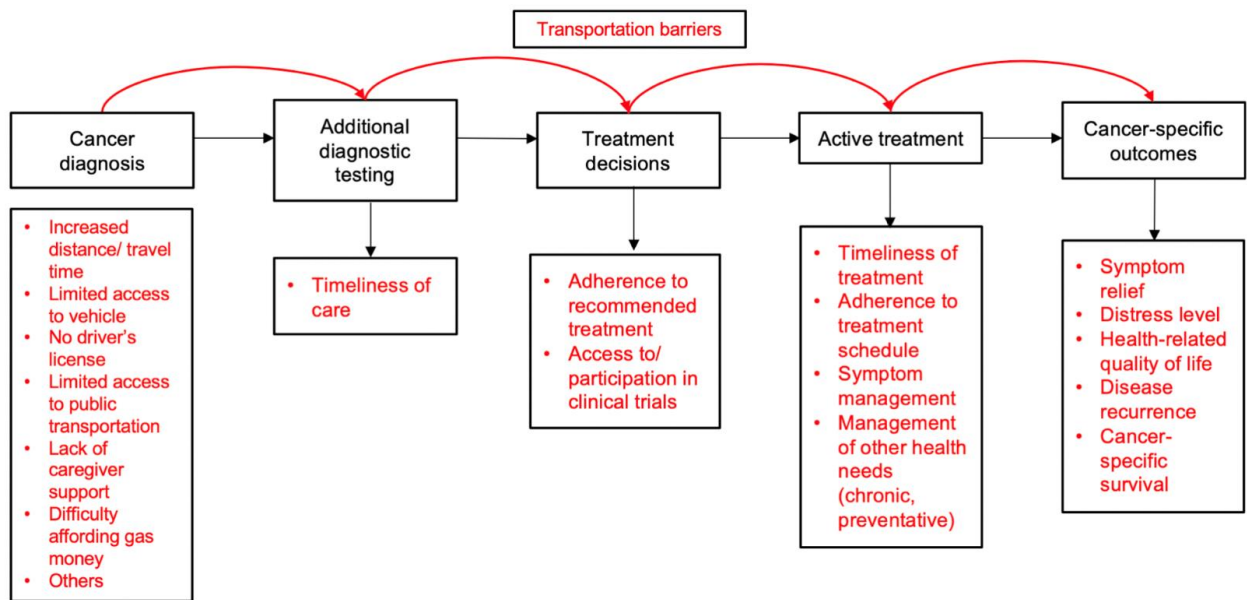


Figure 3. Conceptual model of relationship between transportation barriers and cancer care delivery.

## Microsurgical Resection of Petroclival Meningiomas Treated with Stereotactic Radiosurgery to Address Persistent Post-Treatment Trigeminal Pain

<b>Presenting Author</b>	Aakangsha Jain, BS, Medical Student OMS-2, Department of Neurosurgery, Cleveland Clinic Florida Egil and Pauline Braathen Center, Weston, Florida
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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Background:** Petroclival meningiomas (PCM) are challenging tumors to manage. Observation, surgical resection and radiosurgery have typically been offered as treatment options. A small percentage of patients with petroclival meningiomas present with trigeminal pain. We present four cases of patients with petroclival meningiomas presenting with TN that were treated with radiosurgery and continued to have debilitating trigeminal pain afterwards. The four patients underwent microsurgical resection of their tumor to manage their trigeminal pain.

**Methods:** An IRB approved retrospective study for patients with petroclival meningiomas presenting with TN who were previously treated with stereotactic radiosurgery (SRS) followed by surgical resection were included. The patients' demographics, clinical, and radiological data as well as postoperative morbidity were reviewed. The patients' trigeminal neuralgia outcomes were assessed using the Barrow Neurological Institute (BNI) scale. The primary aim was to assess the improvement of pain after microsurgical resection.

**Results:** Four patients were included in this case series. They all presented with trigeminal pain and were initially treated with SRS. Radiologic tumor control was achieved in all patients after SRS, however the patients continued to have trigeminal pain despite medical management. Subsequently, the four patients underwent microsurgical resection of their tumor with the goal of controlling their pain. All four patients had complete resolution of their TN pain, with a BNI score of I at median follow up of 45 months range 19-61 months

**Conclusion:** Microsurgical resection is a good option for patients with persistent facial pain in petroclival meningiomas who had been treated initially with stereotactic radiosurgery.

### Learning Objectives

Describe the current treatments for PCM associated with TN.

## Risk Factors for Developing Complications Post Thyroidectomy

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

#### Background:

Preoperative planning is a strong predictor for the success of thyroid surgery. In our study, we examine postoperative thyroidectomy outcomes to evaluate modifiable risk factors in the preoperative setting. We hypothesize patients undergoing thyroidectomy will have no difference in complication rates amongst General surgeons compared to ENT physicians, and no difference in complication rates between the different thyroidectomy procedures.

#### Methods:

A single center, retrospective study of adult patients undergoing partial or total thyroidectomy for any indication at an urban teaching hospital. Potential complications analyzed were: hypocalcemia, recurrent laryngeal nerve damage, hematoma, airway obstruction, tracheostomy, and wound infection. Statistical analysis was done by Chi-square and T-test with  $p < 0.05$  as significant.

#### Results:

610 patients were identified from 2001 to 2018. We found a clinical increase in the complication rates between General Surgeons versus ENT physicians performing the thyroidectomy (22.8% vs 15.6%,  $p < 0.061$ ). There was a statistical increase of complications in total thyroidectomies versus other procedures (23.1% vs 14.5%,  $p < 0.033$ ). Clinical increase of complications with left thyroidectomies compared to right (15.5% vs 8.5%,  $p < 0.340$ ). As well as an increased risk of hypocalcemia amongst thyroidectomies versus parathyroidectomies ( $8.57 \pm 0.818$  vs  $9.40 \pm 0.954$ ,  $p < 0.001$ ).

#### Conclusion:

We found a clinical significance between the physician performing the thyroidectomies, increase in complications for both total and left thyroidectomies, an increased risk of post-op hypocalcemia with thyroidectomies compared to parathyroidectomies. Limitations to this study are its retrospective design. We hope to utilize this to be better prepared and reduce the overall rate of complications.

### Learning Objectives

1. Does the area of expertise of the physician performing the thyroidectomy surgery effect the complication rate?
2. Is there a difference in complication rates post-thyroidectomy between right thyroid lobectomy vs left thyroid lobectomy?

## Penetrating Thoracic Injury Requiring Emergency Pneumonectomy Supported with Multiple ECMO Runs

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**INTRODUCTION:** Penetrating thoracic injuries requiring pneumonectomy are uncommon and carry a significant risk of morbidity and mortality upwards of 85%. Occasionally, these patients can develop life-threatening ARDS, with the gravest outcomes associated with right-side pneumonectomies due to resultant right-heart failure. Furthermore, the use of ECMO for traumatic lung injury has demonstrated efficacy with minimal bleeding complications.

**CASE PRESENTATION:** We report the case of a 24-year-old gentleman with penetrating thoracic injury who required right pneumonectomy supported with VV-ECMO for post-operative respiratory failure. The patient first arrived with 2 through-and-through gunshot wounds to the right hemithorax. He was tachycardic and hypotensive with GCS 8, and deteriorated to stage IV hemorrhagic shock with agonal respirations despite bilateral tube thoracostomies, intubation, and initiation of MTP.

**FINAL WORKING DIAGNOSIS:** Laceration of a systemic pulmonary vessel was suspected, and the patient was taken emergent right thoracotomy. Intraoperatively, he had massive hemorrhage from the right middle lobe that could not be stemmed despite numerous attempts. Ultimately a right pneumonectomy was performed and hemostasis was achieved.

**OUTCOME:** The patient's hemodynamics stabilized after surgery, but his hypoxia persisted. Multiple ventilator modalities were attempted unsuccessfully until the decision was made to start VV-ECMO, with the dual objective of supporting oxygenation and allowing for a superior protective lung-ventilation strategy. Subsequently, SvO<sub>2</sub> and PaCO<sub>2</sub> normalized, and his clinical status improved dramatically over the next 96 hours. He was decannulated and placed on high-flow nasal cannula; at this point, he was awake, conversant, and tolerating a diet. However, a subsequent aspiration due to emesis after initial decannulation led to an exacerbation of acute lung injury with precipitously increased oxygen requirements, and ultimately necessitated a second run of VV-ECMO support, a measure unique to this case.

**FOLLOW-UP:** The patient was on ECMO for 23 days until weaned. He was eventually discharged and is now fully recovered without disability 3 years later.

**Learning Objectives**

1. This case demonstrates that ECMO can be a life-saving measure after traumatic pneumonectomy accompanied by severe right ventricular failure or lung failure. This is the first case we are aware of that used ECMO twice on a patient after pneumonectomy and a subsequent lung injury.
2. The use of ECMO after traumatic pneumonectomy has been sparsely reported; this case demonstrates that ECMO can be used after pneumonectomy to allow for lung-protective ventilation as well as to overcome acute hypoxemic decompensation and allow cardiorespiratory support while the right heart adapts to the new hemodynamic changes.
3. We further demonstrate that complications after completion of the first ECMO run should not preclude the initiation of a second ECMO run if deemed necessary.

## Subscapular abscess extending to supraclavicular region: Surgical treatment and negative pressure wound therapy

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

#### Introduction

Patients presenting with non-localizing symptoms of infection around the shoulder, back and chest may present as a diagnostic challenge particularly if these patients are immunosuppressed, malnourished or have a history of intravenous (IV) drug use. A subscapular abscess is part of the differential diagnosis of infection of the upper torso. MRI and CT Scans play a major role in the diagnosis of a subscapular abscess as it can be difficult to discern on physical exam alone due to the location. There are only 8 cases in literature describing subscapular abscess, therefore diagnostic and treatment plans are less well defined<sup>1</sup>. We describe a case of a diabetic patient with IV drug use history who presented with a supraclavicular abscess communicating with a larger subscapular component that grew Methicillin Resistant Staphylococcus aureus (MRSA). These abscesses underwent successful surgical treatment and the patient recovered without any residual deficits.

#### Case Presentation:

GG is a 41 year old male with a past medical history of uncontrolled diabetes and IV drug use, who presented as a transfer from an outlying facility for shoulder pain. He complained of left shoulder and back pain that started three weeks prior to presentation followed by hallucinations requiring hospital admission. He reported IV drug injection into the forearms, but denied injection in the shoulder, neck or back. He denied any trauma or insect bites to this area. On physical exam, the patient had significant erythema of the left shoulder. No induration was noted. White blood cell count was 15,000. ESR 34 and CRP 13.60. Initial CT scan of the neck showed asymmetric subcutaneous and deep soft tissue edema in the supraclavicular region and left upper chest wall muscles with possible joint effusion. Aspiration of the left shoulder joint by orthopedic surgery team was negative on gram stain. A repeat CT Scan on Image A showed a remarkable asymmetry within the left shoulder musculature and subscapularis muscle with multiple loculated abscesses. An MRI was obtained showing a peripheral enhancing fluid collection in the left subscapularis and supraspinatus muscle measuring 6.8 cm x 2.8 cm as seen in Image B. A drain was placed into the subscapular abscess by interventional radiology (IR) team which grew MRSA.

Shortly thereafter, the patient developed supraclavicular edema and erythema. Image C is a soft tissue ultrasound showing a 6.2 cm x 6 cm x 2.1 cm supraclavicular subcutaneous abscess that was incised and drained at bedside. Abscess culture once again grew MRSA. Blood cultures were negative. Pathological analysis showed acutely inflamed, partially necrotic skeletal muscle and fibroconnective tissue with no evidence of malignancy. The patient was started on intravenous Vancomycin. Follow up CT of the neck and chest showed persistent supraclavicular abscess that extended to the subscapularis abscess containing the IR drain. The patient then developed fevers with diaphoresis concerning for sepsis secondary to inadequate source control. Patient noted to have surrounding erythema tracking towards the IR drain posteriorly at the medial border of the left scapula. It was decided that the patient needed formal drainage of the subscapular and supraclavicular abscesses. He was taken to the operating room for drainage. After induction of anesthesia with a single lumen endotracheal tube, the patient was placed in the right lateral decubitus position. The left arm, shoulder, left upper back were prepped and draped in sterile fashion. An incision was made incorporating the IR drain site extending along the medial border of the left scapula.



Blunt dissection was performed in an anterior and superior direction in the subscapular space. Attention was then turned to the left supraclavicular area. This wound was explored deeply, avoiding injury to the great vessels and brachial plexus. Communication to the subscapular area was confirmed with blunt dissection. Nine liters of normal saline were used to irrigate the abscess cavities. Rongeurs were used to debride necrotic tissue from the surrounding bone. Betadine soaked kerlix was used to pack the subscapular and supraclavicular areas.

After 48 hours, patient was taken back to the operating room for further irrigation and debridement. The wound bed was clean and appeared to have healthy tissue, so it was decided to place a negative pressure wound therapy device. The patient was transitioned from IV Vancomycin to oral Doxycycline based on sensitivities, and discharged home with home health. Long term follow up showed well healed wounds, with full range of motion of his left shoulder.

#### Discussion:

Subscapular abscess is an uncommon condition making the diagnosis challenging not only because it is rare but also due to its deep location in the musculature of the back. It is associated with a higher mortality rate when diagnosis and treatment are delayed<sup>2</sup>. The few reports of subscapular abscess highlight blunt trauma and spontaneous occurrence as the primary causes<sup>1,2,3,4,5,6,7</sup>. Children and young adults are the principally affected populations, and MRI or CT scans are the mainstay of diagnostic imaging<sup>1</sup>. To date, literature describing this condition reveals deceptively non-specific signs and symptoms that often result in delay of diagnosis and treatment, which may result in fatality. Surgical drainage is the primary treatment, resulting in largely successful outcomes without chronic sequela. In this case, the patient spontaneously developed the supraclavicular and subscapular abscesses. Whether the drug use was a contributing factor or not, the patient denied injecting into his shoulder or neck. Symptoms were nonspecific and imaging showed presence of the abscesses that grew MRSA. The patients described in current literature show Staphylococcal infection as a major causative organism, though MRSA was less commonly seen than Methicillin-susceptible Staphylococcus aureus (MSSA). The feature that sets this case apart from those in current literature is the extension of the abscess from the subscapular region to the supraclavicular region. Additionally, an IR drain had been placed into the subscapular space and the supraclavicular abscess was drained at bedside. The combination of these procedures were unsuccessful in providing treatment for this problem, and ultimately required surgery. This is confirmed in the previous cases where surgical drainage has been the mainstay of therapy. One case report describes incising the plane between the teres major and latissimus muscles with medial counter incisions to gain access to the subscapular space<sup>4</sup>. The present case makes use of incising the left trapezius and rhomboid muscles medially and connecting the subscapular space to the supraclavicular area. The most successful treatment for any abscess is surgical incision and drainage. Irrigation with copious amounts of fluid is required. It is safe to perform a second look and if the wound is healthy, negative pressure therapy is an excellent option for wound closure when compared to other closure techniques, including primary closure or healing by secondary intention with daily dressing changes. Negative pressure wound therapy is an excellent way to achieve wound closure via secondary intention. It only requires 2-3 dressing changes every week and decreases the length of time to heal. Most importantly, patients are more compliant with wound care as they are more independent and mobile with less dressing leakage than a traditional daily wet to damp dressing changes. A study by Yang C., et al regarding negative pressure wound therapy amongst the pediatric population with soft tissue abscesses requiring surgical incision and drainage shows that those treated with wound vac therapy had shorter length of stay, lower pain scores during dressing changes and had zero recurrence compared to those treated with open daily packing changes<sup>8</sup>. Whenever possible, culture specific antibiotics should be administered.

#### Conclusion:

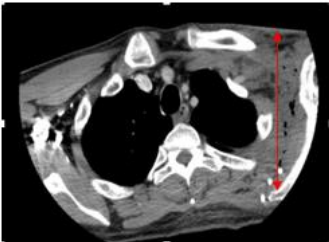
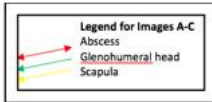
A high index of suspicion, accurate diagnosis and aggressive surgical therapy are required to prevent sepsis and the high mortality in patients with subscapular abscess. Negative pressure therapy could aid in expeditious wound healing.

### Learning Objectives

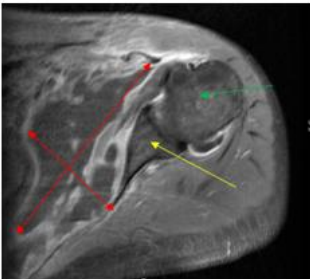
1. Identify and diagnose patients with subscapular abscesses
2. Treat subscapular abscesses decrease morbidity and mortality

### Tables and/or Figures

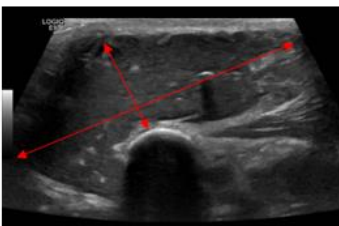
**Image A:** CT Scan of the left supraclavicular abscess extending towards the left subscapular muscle.



**Image B:** MRI showing the subscapular abscess in relation to the left glenohumeral head and left scapula



**Image C:** Ultrasound of the left supraclavicular abscess.



## Biologic Options in Orthopedic Trauma Surgery: A Systematic Review

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

#### Background

The benefit of utilizing bone grafts has been well understood in the orthopedic community for decades. Bone grafting enhances bone repair, specifically in cases of bone loss or void. The classic source for autograft was the patient's iliac crest and resulted in significant morbidity for the patient. Subsequent sterilization techniques and technology has provided surgeons promising allograft options. Furthermore, synthetic options have been introduced in an attempt to decrease the morbidity of autografts and decrease the transmission of disease during allograft procedures. When determining the graft of choice, parameters such as osteoconductivity, osteoinductivity, osteogenicity, graft price, morbidity and complications should all be considered.

#### Methods

A systematic literature review of PubMed and UpToDate databases was conducted. Articles published between 2010 and 2020 were retrieved, and the search was expanded by reviewing articles from reference sections of selected papers. A total of seventy-five articles were selected for the initial review. After examining those, a total of thirty studies met inclusion criteria.

#### Results

Of the three main categories of biologics (auto-, allo-, and synthetic grafts), autografts display the highest compatibility and highest array of desired properties within orthopedics, including optimal osteoconductivity, osteoinductivity, and osteogenicity. Autografts also include the least cost burden, but at a greater risk of morbidity to the patient. Allografts demonstrate slightly less osteoconductive properties, less potential osteoinductive properties, and no osteogenic potential. However, allografts spare the patient of donor site morbidity associated with autograft harvesting. Nevertheless, there is a large propensity for infection transmission and host rejection due to a lack of histocompatibility. Allograft costs vary widely yet stay relatively comparable to structural synthetics. Structural synthetics provide some osteoconductive and osteoinductive properties but pose greater risk of resorption.

## Conclusion

Effective bone healing rests upon the judicious usage of bone grafts, bone substitutes, and synthetic factors. The determination is based on the ability to foster osteogenesis, osteoconduction, and osteoinduction while considering the associated costs and complications. Autograft remains the “gold standard” in regard to histocompatibility and osteointegration properties albeit posing donor site morbidity. To mediate these health risks, allografts and structural synthetics have been utilized. However, the reduced osteogenic and osteoinductive potentials in combination with the relative higher costs and risk of infectious transmissions and resorption has rendered them a case by case modality. The development of different bone graft modalities has nuanced the management possibilities available to surgeons and may spearhead rapid bone healing with increasing clinical effectiveness, safety, and narrower indications for maximized treatment success

## Learning Objectives

The objective of this review study is to outline the advantages and disadvantages of various biologics used in orthopedic trauma surgery.

## Tables and/or Figures

Functions, Properties, and Cost of Graft						
		Osteoconductive	Osteoinductive	Osteogenic	Cost <sup>1</sup>	Complications
Autograft	Cancellous Bone	XXX	XXX	XXX	-----	- Donor site morbidity - Increased operative time - Increased blood loss
	Cortical Bone	XX	X	X	-----	Same as above
	Bone Marrow Aspirate	X/-	XX	XXX	-----	Same as above
	Vascularized Bone	XX	X	XX	-----	Same as above
Allograft	Cancellous	X	X/ <sup>2</sup>	-----	\$380/30 cc <sup>3</sup>	- No osteogenic potential - Infection Potential - Host Rejection
	Cortical	X	X/ <sup>2</sup>	-----	\$530/3 cm <sup>4</sup>	Same as above
	DBM	X	XX	-----	\$730- 1300/10 mL	- Host Rejection - No structural properties
Synthetic	Calcium Phosphate	X	-----	-----	\$1520/10 mL <sup>5</sup>	- Osteoconduction only
	Calcium Sulfate	X	-----	-----	\$655/10 mL <sup>5</sup>	- Osteoconduction only - Rapid Resorption
	BMP	X <sup>6</sup> /-	X	-----	\$3500-5000/vial <sup>7</sup>	- Increased neurovascular complications - Expensive - Limited FDA approval

<sup>1</sup> subject to market availability price fluctuations; <sup>2</sup>X, typically associated with fresh allograft, - associated with frozen-preserved allograft; <sup>3</sup> freeze dried cancellous chips; <sup>4</sup> typically femoral shaft allografts, sold by cm; <sup>5</sup> prices based on average sale price from market leaders of pure products; <sup>6</sup> X when delivered by collagen-based carriers; <sup>7</sup> price change between various market leaders; Medtronic-Sofamor Danek \$3500, Stryker \$5000

## A Case Study of Aberrant Thenar Motor Branch of the Median Nerve Discovered During Carpal Tunnel Release

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Introduction:** Carpal tunnel syndrome (CTS), caused by compression of the median nerve as it travels through the carpal tunnel, is a common entrapment neuropathy, affecting 1-3/1,000 patients per year in the United States.[1][2] Carpal tunnel release (CTR) is a surgical procedure utilized for treatment of refractory cases of CTS. On rare occasions, aberrant positioning of the thenar motor branch (TMB) of the median nerve is observed during these procedures, in which the branch originates from the ulnar side of the median nerve as opposed to the more commonly documented radial origin. We present a case of a patient with an aberrant TMB of the median nerve that was discovered intraoperatively during a carpal tunnel release.

**Case Presentation:** A 54-year-old male undergoing median nerve decompression at the left transverse carpal ligament for treatment of carpal tunnel syndrome secondary to highly comminuted displaced left distal radius fracture. To begin, a proximal palmar longitudinal incision was marked, remaining ulnar to the insertion of the palmaris longus tendon into the superficial palmar fascia to avoid injury to the palmar cutaneous branch of the median nerve. Skin incision was made followed by utilization of blunt dissection. The palmar cutaneous branch of the median nerve was protected and a portion of the superficial palmar fascia and palmaris longus tendons were divided before dissection continued. The palmaris brevis musculature was identified. Dissection continued. A subligamentous ulnar takeoff of the motor branch was identified and released from the ulnar leaf of the transverse carpal ligament. The median nerve was then released from the radial leaf of the transverse carpal ligament to complete full decompression of the median nerve. The palmar incision was closed and dressings were applied. A left long-arm sugar-tong type splint was applied prior to the patient being transferred to the recovery room in stable condition.

**Discussion:** Proper visibility of the carpal canal and understanding of various anatomical possibilities within this space are crucial in avoiding complications during CTR. Aberrant origin of the TMB of the median nerve is an uncommon variation that has been scarcely documented.[3][4] In the Lanz Classification system, Group IV classification includes a variation of the median nerve in which the TMB originates from an ulnar location on the median nerve, bridging the nerve as it approaches the thenar musculature for motor innervation.[5] As the majority of median nerve variations include the TMB originating from the radial side, it is important to record the rare instances of Lanz Classification Group IV to maintain awareness of this possibility and avoid accidental transection of the motor branch. The case presented here exemplifies the rare variation of median nerve anatomy and calls attention to the importance in recognizing the diverse anatomical variations found within the carpal tunnel.

### Learning Objectives

1. Obtain base knowledge of carpal tunnel syndrome and carpal tunnel release
2. Obtain basic understanding of median nerve anatomical variations and their importance

## A Review of Common Bone Substitutes in Depressed Tibial Plateau Fractures

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Background/Knowledge Gap:** Tibial plateau fractures with intra-articular depression as described by the Schatzker classification can lead to premature osteoarthritis due to involvement of the meniscus and articular surface. Demineralized bone matrix (DBM) and autologous bone grafts hold commonplace in open repair of fractures, however, there are many differences between the two types of products with a paucity of literature establishing a gold standard for their use in depressed tibial plateau fractures.

**Methods/Design:** A systematic literature review was performed using PubMed and eMendelley with the intent to understand current treatment standards and outcomes of patients with depressed tibial plateau fractures undergoing treatment with bone graft substitutes. Inclusion criteria for the study included all available literature on tibial plateau fractures, autografts, and allografts, specifically DBM. Keywords utilized in our search included “DBM”, “tibial plateau fractures”, “autografts”, “autograft complications.” Articles were selected from the 2000-2020 to reflect the progression that DBM has made in the treatment of tibial plateau fractures since its discovery in 1965.

**Results/Findings:** Harvesting autologous bone grafts can cause donor site pain, donor site infection, increased blood loss and increased operative time. In addition, autologous bone grafts are limited by volume, as the donor source is scarce. Autologous bone grafting is recognized as the gold standard among the types of bone grafting, however, demineralized bone matrix (DBM) has been also used as an allogeneic alternative to autologous bone grafting as it avoids many of the secondary complications from autologous bone grafts. DBM’s bone morphogenic proteins promote its osteoinductive ability on the surrounding mineral components. Compared to autologous bone grafting, DBM has the advantage of low risk of complication of donor site pain and infection, shortens the operative time, and is not limited to graft amount. DBM is also cost efficient, as it has comparatively equal cost to autogenous bone grafts taken from the iliac crest. Few studies have been done comparing efficacy amongst DBM outcomes despite a wide array of available products. One study however compared two DBM products, Orthoblast and Grafton. Orthoblast was shown to have better treatment outcomes ( $P = 0.035$ ). The difference in outcomes could be due to the variability in formulation and preparation of the different DBM products currently on the market.

**Conclusion/Implications:** There is a paucity of literature in comparison of DBM products as well as a lack of standardization for DBM products due to variabilities between manufacturers. Compared to many of the synthetic bone grafting alternatives, DBM may currently be at the forefront of significant tibial plateau fracture treatment outcomes, but requires allograft bone as a delivery vehicle. Nevertheless, further research is necessary to establish the efficacy, safety, consistency and reliability of its use in comparison to other bone graft options.

### Learning Objectives

This study aims to review the uses and efficacy of different demineralized bone matrix products as a bone graft substitute in the treatment of intra-articular tibial plateau fractures with a focus on understanding the manufacturing, delivery, utilization and efficacy of demineralized bone matrix.

## Pain After Arteriovenous Fistula Creation

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

#### Intro/Purpose:

Dialysis access creation is a common outpatient procedure that can be completed using general, regional, or local anesthetic techniques. There are few endorsed guidelines regarding opioid based pain control following fistula creation. The purpose of this study is to determine if utilization of regional anesthesia is associated with decreased use of narcotics post-operatively.

#### Materials/Methods:

We performed a prospective cohort study including all patients undergoing arteriovenous fistula creation with one vascular surgeon from August 2019 to February 2020. Patients were selected for regional versus general anesthesia. Selection was based upon medical comorbidities and discussion between vascular and anesthesia services. Patients selected for regional anesthesia underwent supraclavicular brachial plexus block with 30 cc 0.5% ropivacaine with or without 4 mg dexamethasone. Patients were seen in clinic follow up and completed a questionnaire regarding their post-operative opiate use and pain control.

#### Results:

In the study time period 52 patients underwent arteriovenous fistula creation and completed the follow up questionnaire. Forty-one patients received regional anesthesia. Fifty-one patients were discharged with a narcotic prescription; of which 75% had filled. There was a significant difference in post-operative opioid use between the two study groups. Patients that received regional block took on average 3.3 pills totaling 16.5 MME, while patients that received general anesthesia took on average 6.64 pills totaling 33.2 MME ( $p=0.04$ ). There was no statistical significance in post-operative opiate use between patients when comparing pre-operative narcotic use, BMI, intra-operative local anesthesia administration, or the addition of over the counter pain medication.

#### Conclusion:

Morbidity and mortality related to opiate use continues to be a public health issue in America. This study demonstrates that regional anesthetic techniques in comparison to general anesthesia can result in a significant decrease in post-operative opiate consumption.

### Learning Objectives

Implement a new strategy for opiate prescribing following arteriovenous fistula creation with the adjunct of intra-operative regional anesthesia.

## Severe sepsis with E.coli bacteremia in patient underlying Strongyloidiasis infection

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

Strongyloidiasis is caused by infection with a helminth *Strongyloides stercoralis*. This organism is capable of completing its life cycle entirely within the human host. Therefore, chronic asymptomatic infection can be sustained for decades, and clinical manifestations can occur long after the initial infection. In addition, among patients with subclinical infection who subsequently become immunosuppressed, larval reproduction can lead to disseminated infection. Migration of filariform larvae during autoinfection may facilitate entry of enteric organisms into the systemic circulation. Clinically, this may manifest as extra intestinal bacterial infections such as pneumonia, meningitis, sepsis or more; therefore, presence of fever and/or hemodynamic instability should prompt evaluation for systemic bacterial infection. In such cases bacterial cultures from the blood, sputum, spinal fluid or other sites may demonstrate enteric flora.

#### Case presentation:

This patient is a 74-year-old man who presented to the emergency room on June 17, 2020 with history of unresponsiveness, confusion, apparently found obtunded, and unresponsive to painful stimuli. On presentation, he was febrile, tachycardic, tachypneic and hypotensive. Initial work-up showed WBC of 2.1, platelets 27 and elevated lactate of 10.4. Because of septic encephalopathy, he was admitted to ICU and blood cultures were obtained. He was placed on broad-spectrum antibiotics with IV vancomycin and Zosyn. Later, the blood culture came positive for *E. coli* and patient was switched to ceftriaxone.

Review of his medical records back from 2008 showed positive serology for *Strongyloides* and significant eosinophilia. But for no clear reason, he was not treated for the infection at that time.

#### Working Diagnosis:

Patient was in the military and he was stationed in some part of the world for many years. While in service he started having severe abdominal complaints and the area where he was stationed is well-known for its endemicity of intestinal parasitosis including strongyloidiasis. Work-up done for intestinal parasitosis showed positive serology for *Strongyloides*. Also, he had developed liver cirrhosis with splenomegaly and ascites for which he had paracentesis. He also had history of gallbladder surgery. Persistent disseminated *Strongyloides* is well known to cause all the above conditions as secondary complications occurs over the years in addition to the classic well-documented *E. coli* bacteremia with worm carrying the *E. coli* to everywhere in the body, to brain, lungs during its migration from the GI tract.

#### Management:

Patient was managed in ICU settings initially with broad-spectrum antibiotics later on ceftriaxone after blood culture showed *E. coli* bacteremia. Due to constraint related to insurance, Ivermectin on a 4 -dosage regimen was chosen instead: 200 micro grams per KG daily for 2 days on 8 and 9 July 2020 and repeat after 14 days and thereafter 18 mg per orally monthly for 6 months starting 9 August 2020. Will be monitoring CBC and CMP monthly till the end of treatment.



**Learning Objectives**

Clinicians should always look for underlying strongyloidiasis in patients with serious infections due to enteric organisms without readily identifiable source in the presence or absence of peripheral eosinophilia.

## The mTOR Inhibitor, CCI-779, Attenuates Angiogenesis In Vitro via the inhibition of mTOR/ STAT3/HIF-1 $\alpha$

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

Background: HPV-negative (-) head and neck squamous cell carcinoma (HNSCC) has a recurrence rate of 50-60%, with 75-85% of tumors expressing TP53 mutations.

mTOR inhibitors (mTORi) have been shown to increase progression-free survival in TP53-mutant HNSCC, however, its underlying mechanism remains unclear. One hypothesis is that mutant P53 activates mTOR/STAT3/HIF-1 $\alpha$  pathway, which increases the level of VEGF protein thereby inducing neovascularization that causes tumor recurrence. Based on that, the attenuation of these pro-angiogenic cytokines would create a less-than-favorable tumor microenvironment for residual tumor cell survival and proliferation. The goal is to determine the effects of a mTORi on mTOR/STAT3/HIF-1 $\alpha$  /VEGF pathway in HPV (-) TP53 mutant HNSCC cell line, to measure the effect of mTORi treatment on HPV (-) TP53 mutant HNSCC mediated in vitro angiogenesis.

Methods: The effect of CCI-779 on STAT3/HIF-1 alpha pathway was analyzed by Western blot. The in vitro effect of CCI-779 on angiogenesis was determined using HMEC cell line. In vitro endothelial cell proliferation was done using MTS assay, while cell migration assay was done using crystal violet staining.

Results: In vitro, CCI-779 significantly ( $P < 0.05$ ) decreases the levels of Hif-1 $\alpha$  and VEGF-A via the inhibition of mTOR/STAT3/HIF-1 $\alpha$  pathway in an HPV (-) TP53 mutant HNSCC cell line when compared with wild type TP53 cell line. The ability of CCI-779 to decrease VEGF-A expression also significantly ( $P < 0.05$ ) reduces the migration and cell viability of endothelial cells in the conditioned media from an HPV (-) TP53 mutant HNSCC cell line, compared to the wild type TP53 cell line.

Conclusions: In vitro, CCI-779 appears to reduce the expression of HIF-1 $\alpha$  and angiogenic cytokine VEGF-A more efficiently in HPV (-) TP53 mutant HNSCC cells, compared to the wild type TP53 cell line which in turn significantly reduces the angiogenic ability of TP53 mutant HNSCC cell line.

### Learning Objectives

Describe the need for adjuvant therapy for patients with high risk, HPV (-) HNSCC

Describe the effects a mTOR inhibitor may have on a neovascularization pathway, mTOR/STAT3/HIF-1 $\alpha$ , and how this may affect tumor recurrence.

## Blinded by Bradycardia: Unexpected Presentation of COVID-19 Pneumonia

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** The first case of coronavirus disease 19 (COVID-19) was discovered in Wuhan, China in December 2019. Within a few short months, the Severe Acute Respiratory Syndrome-Coronavirus 2 (SARS-CoV-2) was declared a pandemic.

The cardiac manifestations of COVID-19 were discovered relatively quickly, mostly in the form of direct myocardial injury, myocarditis and wide-complex arrhythmias. Acute cardiac injury (serum troponin elevation above 99th percentile) is the most commonly reported cardiac complication in COVID-19.

Bradycardia is another cardiac manifestation of COVID-19 that appears to be relatively specific to the disease. Recent studies have correlated positive serum viral antigens to the extent of bradycardia and have observed resolution of bradycardia once viral serologies become negative. This can be an important diagnosis and prognosis tool in the setting of COVID-19.

**Case Presentation:** We present a 66-year-old Caucasian female with a past medical history of asthma, hypertension, and type-II diabetes mellitus. The patient complained of fevers, worsening shortness of breath and nonproductive cough for the past six days. The patient works as a nurse practitioner and admitted to recent exposure to patients with COVID-19. COVID-19 was confirmed by detection of SARS-CoV-2 in polymerase chain reaction (PCR) of nasopharyngeal specimen.

Initial vitals revealed temperature 98.6°F, heart rate 50 bpm, respirations 16, BP 159/78, O2 sat 93% on Room Air. D-Dimer was elevated on admission 3,650; repeat negative x2. Initial labs reveal WBC normal, mild anemia, and mild hypokalemia. No overt acute kidney injury, but mildly elevated BUN of 24. Serum magnesium, troponin, and TSH were also normal. Chest radiograph revealed signs of bilateral consolidations consistent with multifocal pneumonia. Chest CT Angiography was negative for pulmonary embolism, but did show consolidations consistent with COVID-19 infection. EKG demonstrates sinus bradycardia of 46 bpm with no acute ST changes. Repeat EKG revealed significant bradycardia of 42 bpm, again without acute ST changes.

On exam, patient was ill-appearing, alert, tachypneic, and in moderate respiratory distress with signs of accessory muscle use. Cardiac exam revealed obvious bradycardia without murmurs or rubs. The patient was symptomatic from her bradycardia, with dizziness and lower blood pressure observed with episodes of bradycardia.

Differential diagnosis included COVID-19 related Sinus Node dysfunction, primary SA Node dysfunction, obstructive sleep apnea, medication adverse effect including AV-Blocking agents.

**Final/Working Diagnosis:** Bradycardia from Sinus Node Dysfunction, related to COVID-19

**Management/ Outcome/and or Follow-up:** Cardiology was consulted for evaluation of patient's bradycardia. After extensive review of the patient's home and inpatient medications, medication adverse effect was essentially ruled-out. There was no correlation to the patient's bradycardia to a specific activity or time of day. Transthoracic echocardiogram (TTE) was ordered to exclude structural heart pathology and revealed normal EF 54%, normal atrial and ventricular size,

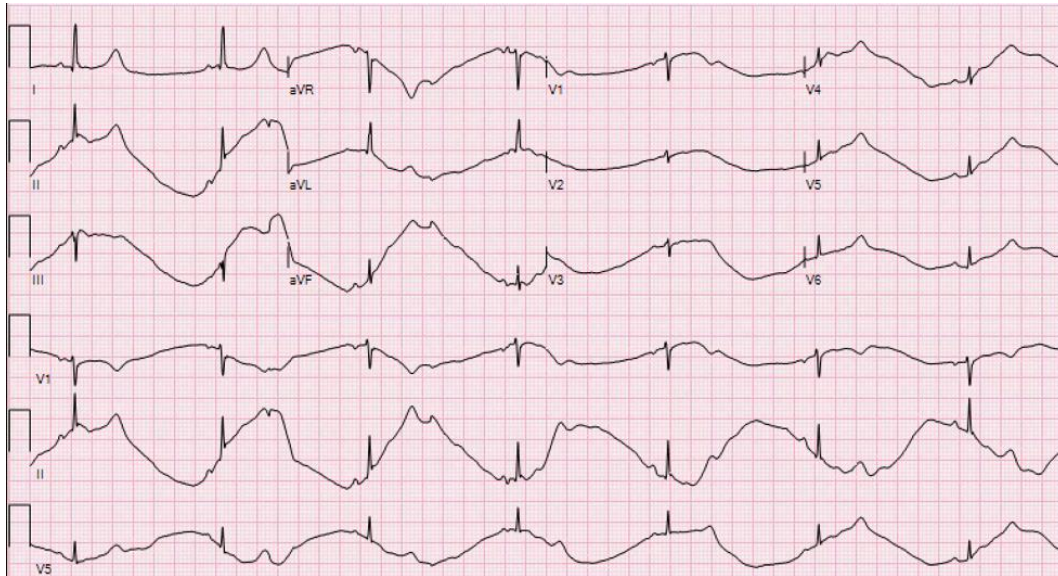
and no significant valvulopathy. Prophylactic Enoxaparin 80 mg SQ BID was provided since COVID-19 is known to significantly increase the risk of venous thrombosis.

The patient's bradycardia gradually improved with conservative management. Patient did not require temporary pacemaker placement. AV-Nodal blocking and QT prolonging agents were avoided throughout hospital stay. While the etiology could be multifactorial, severe hypoxia, damage of cardiac pacemaker cells from inflammatory cytokines, and exaggerated response to medications are possible triggers. The patient's bradycardia ultimately resolved and the patient's COVID-19 viral serology was repeated prior to discharge, which returned negative. This correlation may be an important tool in the diagnosis and management of COVID-19 patients.

### Learning Objectives

1. Bradycardia is a cardiac manifestation of COVID-19 that has not yet been widely published
2. It is imperative to maintain a broad differential with symptomatic bradycardia
3. Clinicians must be aware of this atypical cardiac presentation of COVID-19, especially in the setting of a pandemic

### Tables and/or Figures





## Botulinum Toxin Used for Treating Menstrual Related Migraines: A Retrospective Study

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Chronic migraine is a condition that causes significant impairment. Women are three times more likely to suffer from migraines than men. Up to 70% of these women have migraines associated with menstruation. Botulinum toxin is FDA approved to treat chronic migraines and given a possible similar pathophysiological mechanism, it could also be a therapeutic option in menstrual related migraines. To date, no studies have specifically evaluated the efficacy of botulinum toxin in the treatment of menstrual related migraines. The purpose of this study was to assess the efficacy of using botulinum toxin in the treatment of specific menstrual related migraines.

**Methods:** This was a retrospective study of the efficacy botulinum toxin in menstrual related migraines at the Naval Hospital Jacksonville from January, 2018 to August, 2019. We included patients who were diagnosed with chronic migraine, received botulinum toxin per the PREEMPT protocol, and also reported a history of menstrual related migraine.

**Results:** 11 patients were included in this study. Despite an average decrease in headache days per month of 14.3 (65% improvement on average), there was no change in the duration or severity of each patient's menstrual related migraines.

**Conclusion:** This is the first study of the efficacy of botulinum toxin in chronic migraineurs with comorbid menstrual related migraines. Despite its clear efficacy in chronic migraine, botulinum toxin may not be as effective in treating menstrual related migraines. Female patients should be counseled regarding their menstrual related migraines when instituting this therapy. Future studies should evaluate different treatment modalities in treating this common and debilitating condition.

### Learning Objectives

1. ) Describe the differences of various migraines.
2. ) Discuss risks, benefits, and indications of onabotulinumtoxinA therapy for migraines.

## High Ammonia, And It's Not The Liver?

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Roux-en-Y gastric bypass is the most commonly performed bariatric surgery. Hyperammonemia as a complication of this surgery is poorly understood.

**Case Presentation:** A 63 year old woman with Roux-en-Y gastric bypass surgery presented 3 months prior to the current admission with progressively declining functional and cognitive status. Workup revealed elevated ammonia levels with normal liver functions. Liver biopsy showed non-alcoholic steatohepatitis without cirrhosis. Lactulose was initiated. She was transferred to a psychiatric facility due to neuropsychiatric symptoms. Following minimal improvement, she was discharged.

This admission, she was in septic shock and required mechanical ventilation. History was limited since family and records were unavailable. Physical exam revealed anasarca. Labs showed anemia, neutrophilic leukocytosis, acute kidney injury. Albumin was 1.0gm/dl, AST- 40U/L, ALT- 60U/L, ALP- 180U/L, total bilirubin- 1.4mg/dl. CT brain was normal.

On day 3, oxygenation improved, shock and AKI resolved. However, she continued to be obtunded off sedation. She developed continuous myoclonic jerks. EEG revealed generalized epileptiform discharges. Ammonia level was elevated at 543 mmol/l while liver function tests (LFTs) were normal.

**Working diagnosis:** Urease producing bacteria and medications like valproate were excluded. Other non-hepatic causes of hyperammonemia such as inborn errors of metabolism, total parenteral nutrition, gastric bypass were being considered.

**Management and follow up:** Myoclonic jerks remained uncontrolled with anti-epileptics and other sedatives. Elevated ammonia levels with normal LFTs prompted further investigation. Given her surgical history, gastric bypass was considered as the most likely etiology. Less than 30 cases of hyperammonemia due to gastric bypass have been reported. Symptoms can occur from months to years following surgery. Literature review showed that lactulose, rifaximin, reversal of gastric bypass and hemodialysis have all been tried. Unfortunately this condition has poor prognosis and is usually fatal. Given her decline, family withdrew care and patient eventually succumbed.

### Learning Objectives

1. To identify the non hepatic causes of elevated ammonia levels, which are not discussed often.
2. To create awareness that elevated ammonia levels may be a side effect of several surgical procedures and have a high degree of suspicion for hyperammonemia if such patients present with altered mental status.

## Clinical, Pathologic and Genomic Characteristics of MET Exon 14 Mutation in Lung Cancer

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Background:** Mesenchymal-to-epithelial transition (MET) gene mutations, found in 3% of patients with non-small cell lung cancer (NSCLC), have been recognized as a potentially important therapeutic target with the recent approval of MET inhibitor Capmatinib. New technology RNA-Seq has made it possible to directly detect and quantify splice mutation. We set up this study to investigate the clinical significance of this variable RNA expression level of MET with exon 14 splice mutations in patients with NSCLC.

**Design:** This is a single-center retrospective study of patients with tissue biopsy diagnosed with NSCLC who have undergone genetic tests via RNA-Seq in AdventHealth Orlando from 01/01/2019 and 01/30/2020. Demographic information and clinical data on staging, metastasis, co-existing mutation and treatment were collected. MET14 splice copy number >1000 and MET14/Control gene ratio of 0.05 was used to differentiate between low and high expression.

**Results:** There were 18 and 17 patients in the low and high expression groups, respectively. The low expression group were notably younger, with history of smoking, higher chance of brain metastasis and harboring lower programmed-death ligand 1 (PD-L1) than its counterpart. All 18 patients within the low expression group were noted to be adenocarcinoma with frequent co-existing gene mutation, as compared with the high expression group with zero co-existing gene mutation. More patients in the high expression group received MET inhibitor treatment.

**Conclusions:** With the advancements of using RNA-Seq, more MET Exon 14 splicing mutations are able to be detected and quantified. With this new information our data has shown that different RNA levels of expression display different statistical and clinical outcomes. The novelty of this information may be useful when considering the new class of MET 14 exon inhibitors that are available and how they may have different efficacy dependent upon low versus high expressivity.

### Learning Objectives

Identify the sequencing method used to detect MET 14 exon splicing mutation.

Discuss novel treatment options for patients found to have MET 14 exon splicing mutation.



## Tables and/or Figures

	Low expression	High expression
N	18	17
Age	63.61111	74.29412
Gender(Female%)	61.1%	76.5%
Race(Caucasian%)	61.1%	76.5%
Hx of smoking	77.8%	47.1%
Family hx of Cancer	44.4%	29.4%
Stage 4 at diagnosis	66.7%	70.6%
Remote Metastasis	55.6%	58.8%
Brain metastasis	16.7%	5.9%
Type (Adenocarcinoma %)	100.0%	82.4%
Positive PD-L1%	16.7%	23.5%
Co-existing gene mutation	66.7%	0.0%
Use of MET inhibitor	0.0%	29.4%

## Colorectal Cancer Masked by a Diverticulitis Abscess

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

In the United States, colorectal cancer is currently the third most common cause of cancer and also the third most common cause of cancer-related deaths in men and women combined. Major risk factors for colorectal cancer are inflammatory bowel disease, abdominal radiation, predisposing inherited syndromes (familial adenomatous polyposis, Lynch syndrome, etc.), and African American descent.

A minor risk factor for colorectal cancer is diverticulitis. Colorectal cancer has a 1.9% one-year incidence rate in patients with diverticulitis. The American Gastroenterological Association recommends patients with acute diverticulitis to undergo colonoscopy 6-8 weeks after diverticulitis treatment to rule out underlying colorectal malignancies.

#### Case Presentation

A 49-year-old African American female with past medical history of diverticulitis, chronic anemia, and family history remarkable for maternal gastric adenocarcinoma at age 70 presented with chief complaint of abdominal pain.

On physical exam, the cramping pain was located in bilateral lower abdominal quadrants and did not radiate. The patient denied ever having a colonoscopy. Review of systems revealed fever, nausea, and vomiting, but she denied hematochezia. The patient was admitted at an outside institution in early January 2020 for abdominal pain. CT abdomen/pelvis completed at that time reportedly showed acute diverticulitis with an abdominal wall abscess, which was treated with IV antibiotics followed by oral antibiotics upon discharge. Follow-up CT abdomen/pelvis after discharge reportedly showed diverticulitis without abscess.

CT abdomen/pelvis completed at Westside Regional Medical Center in mid-February 2020 showed a large abscess in the lower anterior abdominal wall (Figure 1) that likely communicated with the sigmoid colon, as well as a 3.5 cm mass in the proximal sigmoid colon. Interventional Radiology drained the purulent and feculent abscess, and follow-up CT abdomen/pelvis showed a persistent mass in the proximal sigmoid colon (Figure 2). CEA and CA 19-9 tumor markers were found to be markedly elevated, suggestive of a GI malignancy. Exploratory laparotomy with left and sigmoid colectomy, loop ileostomy, and resection of lower left quadrant abdominal wall was completed. The abdominal wall abscess was also drained. Pathology revealed a 6 cm T4N1b colon adenocarcinoma. However, negative margins could not be achieved as the malignancy extended to nearby bone.

The patient continued to receive IV antibiotics after the exploratory laparotomy, and will be receiving 4-6 weeks of adjuvant chemotherapy due to the high risk of residual cancer and metastatic disease.

#### Discussion

Diverticulitis can further be described as uncomplicated or complicated. Uncomplicated diverticulitis is defined as peri-diverticular inflammation. Complicated diverticulitis is defined as diverticulitis with diverticular abscess, perforation, or fistula.

The American Gastroenterological Association recommends patients with acute diverticulitis to undergo colonoscopy 6-8 weeks after diverticulitis treatment. One primary reason is because colorectal cancer may have been misdiagnosed as

complicated diverticulitis when the original imaging was performed, especially if the diagnosis was based on CT imaging. Diverticulitis and colorectal cancer both present with colonic wall thickening on CT. Diverticulitis can be more confidently diagnosed radiographically if inflamed diverticula, pericolic fat stranding, and preserved bowel enhancement pattern are visualized. However, in the case of complicated diverticulitis, these radiological features may be hard to visualize and cannot reliably differentiate colorectal cancer from diverticulitis. Thus, in order to rule out misdiagnosed colorectal cancer in complicated diverticulitis patients, colonoscopies have been recommended.

#### Conclusion

Performing a colonoscopy after diverticulitis healing to rule out colorectal cancer is recommended in this patient population. While there is not a strong causal association between diverticulitis and colorectal cancer, recommending diverticulitis patients to get a colonoscopy 6-8 weeks following treatment is paramount, especially if the patient has not received a prior colonoscopy within a year, are close to screening age, or has a positive family history of colorectal cancer. These recommendations would help to catch colorectal cancer early and can improve treatment outcomes before the cancer metastasizes.

#### Learning Objectives

Discuss the importance of performing a follow-up colonoscopy in patients with recent diverticulitis.  
Describe the similarities and differences between diverticulitis and colorectal cancer based on imaging.  
Identify additional risk factors that would favor performing colonoscopy in diverticulitis patients.

Tables and/or Figures

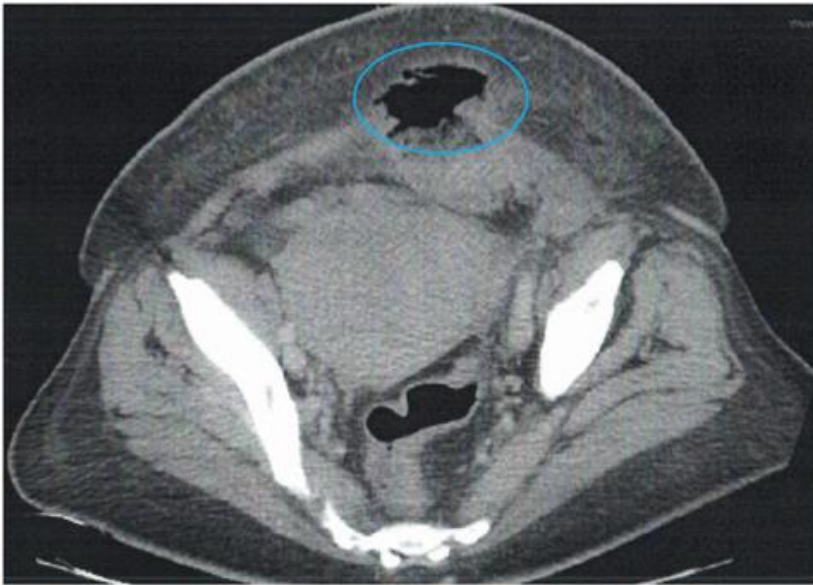


Figure 1. CT showing abdominal abscess that perforated into proximal sigmoid colon (blue circle)

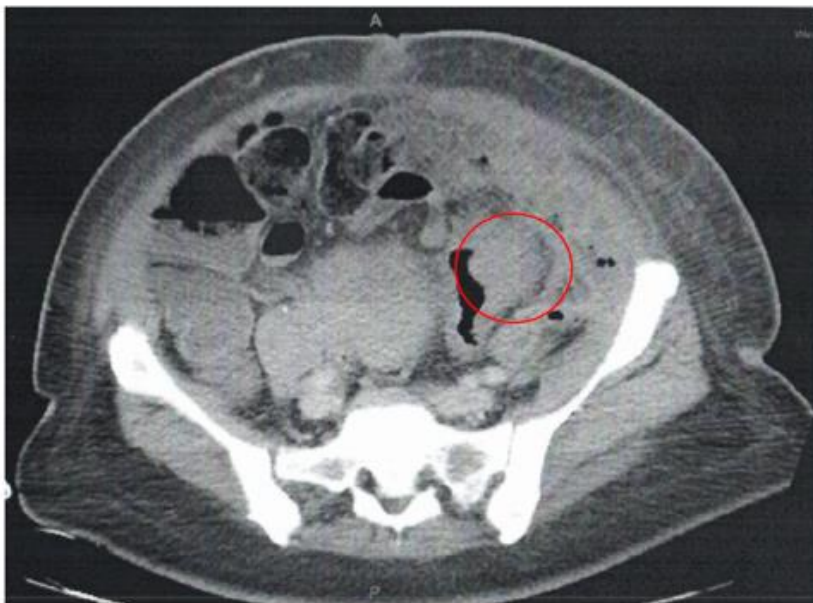


Figure 2. CT showing proximal sigmoid mass post abdominal abscess drainage (red circle)

## Evaluation of Telehealth in multiple aspects by patients and physicians

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Background:** During the COVID-19 pandemic, most health care providers started to adopt the Telehealth model to comply with social distancing and minimize unnecessary exposure. This unprecedented transformation in medical practice poses great challenges to both physicians and patients. Little is known about how well internal medicine residents, faculty, and patients adapt to this new normal. We set up a survey to investigate the feedback of both physicians and patients to Telehealth visits.

**Methods:** Anonymous surveys with multiple questionnaires were conducted via phone call to patients or electric-survey to all faculty and residents in a tertiary community hospital internal medicine residency program from 04-07-2020 to 06-25-2020. Demographic information, number of Telehealth encounters, assessment of overall experience, satisfaction, and concerns of Telemedicine for both patients and physicians were collected.

### Results:

A total of 50 patients and 45 physicians participated in our survey. Most (84%) of patients in our cohort were first- or second-time users for Telehealth, 84% of patients were older than 40 years, and 60% were female. The majority of patients had positive experiences with Telehealth visits and would like to continue it in the future. 94% of patients felt like their concerns were adequately addressed despite 14% of them experienced technical issues during visits.

In contrast, the feedback from physicians was less positive than patients. More than 60% of physicians experienced technical issues during encounter and nearly 60% of physicians were neutral or not satisfied with Telehealth. Nearly 50% of physicians were reported to feel difficult to transition to Telehealth and only 29% of physicians felt the patients' complaints were adequately addressed. Most physicians will have to schedule in-person visits after video visits.

In our statistical analysis, there was no significant difference in the rate of 'like to continue telehealth' between patients versus physicians; 44% vs 72% ( $p=0.408$ , in Fisher Exact test). But interestingly, there was a significant difference in the satisfaction rate between patients and physicians; 84% vs 42% ( $p=0.024$ ). Also, 94% of patients answered their concerns were properly addressed while only 29% of physicians answer the patient's concerns were properly addressed. (94% vs 29%,  $p < 0.001$ ).

**Conclusion:** Both patients and physicians revealed a strong tendency to continue telemedicine despite patients showed significant satisfaction to Telemedicine over physicians. Significant technical issues reported both from patients and physicians which remind us of the necessity of more technical and process improvement.

### Learning Objectives

To better understand how patients and physicians evaluate Tele-health.

To learn whether there are any differences in satisfaction and viewpoint about telemedicine between patients and physicians

### Tables and/or Figures

Table1. Summary of patients' Survey

Patient characteristics and feedbacks		n= 50 (%)
Age (year)	<40	8 (16%)
	40--59	17 (34%)
	>60	25 (50%)
Gender	Female	30 (60%)
	Male	20 (40%)
How many times of e-visits?	1 time	34 (68%)
	2 time	8 (16%)
	3 time or more	8 (16%)
How difficult was to use Telehealth (0 being the easiest and 5 being the most difficult)	0 ~ 1	38 (76%)
	2 ~ 3	6 (12%)
	4 ~ 5	6 (12%)
How satisfied are you with Telehealth visits?	Not at all satisfied	3 (6%)
	Slightly satisfied	1 (2%)
	Neutral	4 (8%)
	Very satisfied	10 (20%)
	Extremely satisfied	32 (64%)
How likely are you to continue telemedicine after the completion of social distancing? (0 being not at all likely and 5 being extremely likely)	0 ~ 1	11 (22%)
	2 ~ 3	3 (2%)
	4 ~ 5	36 (72%)
Do you think that your concerns are adequately addressed during telehealth visits?	Yes	47 (94%)
	No	1 (2%)
	Somewhat	2 (4%)
Do you encounter any technical issues during telehealth visit (E.g losing connection)?	Never	33 (66%)
	Rarely	10 (20%)
	Sometimes	3 (6%)
	Often	1 (2%)
	Always	3 (6%)

## Nintedanib Induced Colitis Treated Effectively with Budesonide

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

Nintedanib, a tyrosine kinase inhibitor, displays antifibrotic activity via blockade of three receptors (PDGFR, VEGFR, and FGFR). This drug was initially developed as an anti-tumor agent but was later recognized for its unique antifibrotic activity. It is mainly cleared by liver metabolism, with most of the metabolites being excreted in the feces (feces 93.4%, urine <1%). The most common adverse effect associated with nintedanib is diarrhea (62 %), which has led to a permanent dose reduction in 11 % of patients and discontinuation in 5 %. Here we report a case of nintedanib induced diarrhea with complete clinical resolution after treatment with oral budesonide.

#### Case Presentation

A 68-year-old male with a past medical history of interstitial pulmonary fibrosis (IPF) and chronic diarrhea for 3 years was admitted to the hospital with the chief complaint of hematochezia and worsening diarrhea. He denied any abdominal pain or nausea. In the past 3 years, he was taking nintedanib (150 mg twice daily) for IPF. For his diarrhea, he was maintained on cholestyramine twice a day and other antidiarrheals, but his diarrhea persisted and worsened. A colonoscopy performed 2 years ago showed non-specific moderate diffuse colitis.

The physical examination and vital signs were unremarkable. His blood work, including complete blood count (CBC) and comprehensive metabolic panel (CMP), was within normal limits. His CRP was mildly elevated. Repeat colonoscopy revealed diffuse areas of erythematous, friable, and granular mucosa throughout the entire colon, similar to the previous endoscopic findings. Histopathology showed acute superficial inflammation, and expansion of lamina propria by lymphoplasmacytic infiltrate, raising the possibility of nintedanib induced colitis. As it was more pertinent to continue with nintedanib for his IPF, we elected to treat his colitis with budesonide. He was started on 9 mg oral budesonide with the plan to slowly taper it to the minimum effective dose. His diarrhea gradually improved, and at his follow up visit about 4 months later, it had completely resolved.

Final diagnosis: Nintedanib-induced diarrhea/colitis

#### Management:

The mechanism of nintedanib-induced diarrhea/colitis remains unknown. One of the proposed mechanisms involves direct inflammation of the intestinal epithelium induced by nintedanib decomposition products. Nintedanib is primarily cleared via liver metabolism, with most of the metabolites being excreted in the feces. This inflammation, like that of inflammatory bowel disease, may respond to corticosteroid treatment resulting in the improvement of diarrhea.

In our patient, stopping this medication was not a viable option since it was very effective in reducing disease progression. We used budesonide, a glucocorticoid with high first-pass metabolism, as its systemic side effects would be less severe as compared with conventional glucocorticoids. The patient had complete clinical remission in less than three months.

**Learning Objectives**

Diarrhea and colitis are a well known common side effect of nintedanib and often lead to the discontinuation of this medication. In patients with nintedanib induced colitis/diarrhea who are resistant to oral antidiarrheal medications, budesonide could be a viable option to cure this common side effect. Further research is needed to help standardize its use and prevent IPF treatment interruption.



## Inpatient Dermatology Consultations for Suspected Skin Cancer: A Retrospective Review

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Background:** Dermatologists are consulted in the inpatient setting to rule out possible skin cancer. This provides an opportunity to identify and treat cutaneous malignancy, often in patients who may not have sought outpatient dermatologic care.

**Goals:** Seeking to better understand the nature of these patient encounters, we reviewed all consults for which the referring physician suspected skin cancer.

**Methods:** We conducted a retrospective review of inpatient dermatology referrals at an academic-affiliated, tertiary medical center. We identified all patients with an inpatient dermatology consult for suspected skin cancer or "skin lesion" between 07/01/13-07/01/19. We collected patients' sex, age at time of consult, race, specialty of referring provider, lesion location, lesion maximum diameter, whether a biopsy was performed, inpatient vs outpatient setting for biopsy, clinical diagnosis, histopathologic diagnosis, and subsequent treatment.

**Results:** Consults were received from many specialties (12 total). 47 total lesions in 38 patients were identified, with the majority on the head and neck (66%). Of 38 total patients referred for possible skin cancer, 20 were found to have at least one pathology-confirmed cutaneous malignancy (23 total tumors). Of these, 10 were basal cell carcinoma, 11 squamous cell carcinoma, 1 malignant melanoma, and 1 anaplastic T-cell lymphoma. 17 of the 23 tumors were  $\geq 2.0$  cm in diameter at the time of biopsy (74%). Subsequently performed treatments for these patients included wide local excision (3), Mohs micrographic surgery (5), radiation (3), topical fluorouracil (1), electrodesiccation and curettage (4), and chemotherapy/immunotherapy (2).

**Conclusion:** About half of the consultations for cutaneous malignancies resulted in a skin cancer diagnosis. Patients in this population were admitted to the hospital for a variety of diagnoses, most unrelated to their cutaneous malignancy, suggesting that the inpatient setting offers the opportunity to identify skin cancer which may otherwise be unaddressed. This study highlights the surprising number of large diameter, high risk tumors identified.

### Learning Objectives

- Following this presentation, attendees will recognize the importance of in-patient dermatology consultation for suspected cutaneous malignancy.
- Following this presentation, attendees will be able to describe the characteristics of cutaneous malignancies identified at this academic, tertiary medical center.

## Coronary Artery Kink : An Unusual cause of MI.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Submission Type</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Coronary artery kink is a variant of anomalous coronary arteries. These kinks are not related to vessel disease and are associated with coronary artery tortuosity (CAT) & Fibromuscular dysplasia. The prevalence of CAT is more common in females as compared to males [2,3]. In the literature, such angiographic findings are commonly seen with aging, atherosclerosis, hypertension and other conditions [1]. The precise pathogenesis and clinical implications of CAT are not fully understood [9] Kinks are hypothesized to cause coronary blood flow alteration resulting in ischemia, atherosclerotic plaque formation and even acute coronary syndrome. It is speculated that the coronary artery kinks are most often caused by guide wire straightening and seen after wiring the artery rather than pre intervention [5] however that is not always the case. Here we present a case of Right coronary artery (RCA) kink causing NSTEMI in an otherwise healthy female.

**Case Presentation:** A 64-year-old post-menopausal Caucasian female with no significant past medical history presented with a typical sub sternal, pressure like chest pain associated with dyspnea, diaphoresis, dizziness and pre-syncope. The pain was worse with exertion and relieved with rest. She had no known risk factors for coronary artery disease and had no recent stressful events.

She had an unremarkable physical examination and vitals were largely stable except for mild hypotension with BP of 98/54.

Electrocardiogram (ECG) on admission showed normal sinus rhythm and changes consistent with Left atrial enlargement without any acute ischemic changes. (Fig.1).

Troponin I level upon presentation was elevated at 0.27 ng/mL and continued to trend up with subsequent reading of 0.93 ng/mL. A complete blood count , complete metabolic panel , electrolytes , D dimer, TSH with free T4 were all within normal limits. Chest X-ray was normal without any acute cardiopulmonary findings.

Patient had a left heart catheterization which at first glance, the coronary arteries did not exhibit any apparent significant arteriosclerotic or thrombotic changes. However, upon closer review, images revealed focal minimal coronary artery disease in mid right coronary artery (RCA) , normal left coronary artery and a "kink" at the lesion site in the mid RCA that folded with systole causing up to 90% stenosis (Fig.2) and then resolved to < 10% with diastole (Fig.3) (Video-1).

Left ventriculography revealed global left ventricular systolic function reduction with estimated ejection fraction of 45-50 % and akinesia of inferior and posterior left ventricular wall which correlated well with the location of the kink.

Echocardiography with adequate image quality revealed left ventricular ejection fraction of 40-45%. Wall scoring showed akinesia of mid and distal inferior wall along with inferior and lateral segments.

Given the above findings, the patient was diagnosed to have a Non ST elevation Myocardial infarction due to mechanical obstruction from Right coronary artery kink.

Management: Management of kinks is controversial. Literature in the past have suggested coronary stenting as one of the management options [9,10]. Similar conditions in the past have been treated with stents with great success and without any immediate or late post procedural complications [5,11,12]. However, even though not in the native coronary artery, there are reported cases of adverse outcomes in such cases with coronary stenting. Rerkpattanapipat and colleagues [9] reported a case treated with intracoronary stenting that shifted the kink proximally requiring additional PCIs.

Patient was subsequently treated medically with Beta blocker, Angiotensin CE inhibitor, Aspirin and Statin. Patient was not considered to be a candidate for PCI as it would shift the kink to the stent edges potentially causing additional kinks at both proximal and the distal end of the stent. It could also cause long term sequelae such as stent fracture due to repeated flexure of the stent.

The patient has since then remained asymptomatic and there has been no evidence of continued ischemia in the first quarter of follow up period. A repeat Echocardiogram 3 months after the treatment showed good ventricular remodeling and improvement in left ventricular EF to 55-60%.

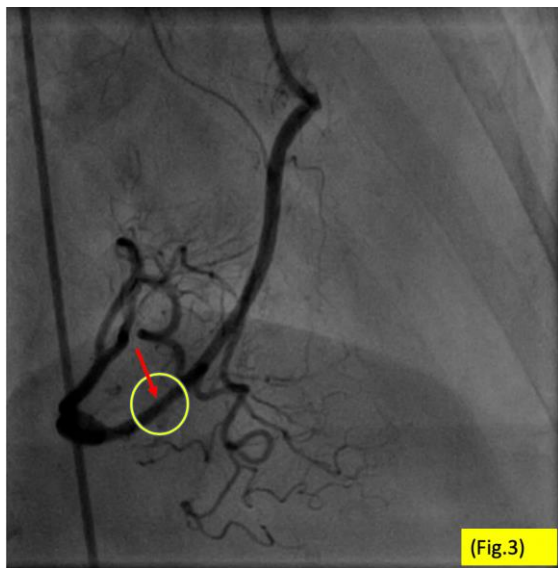
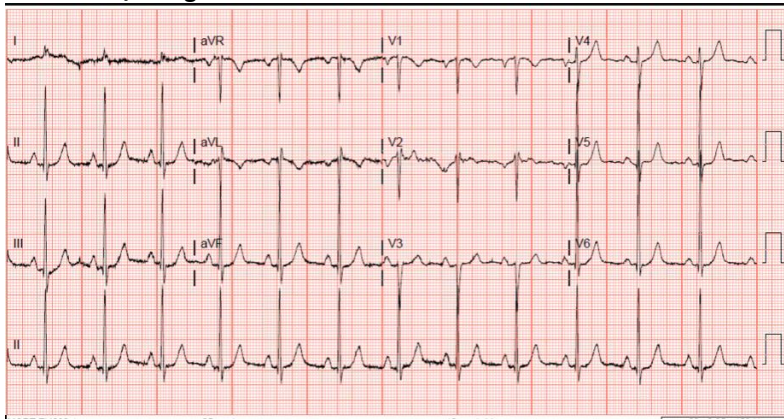
### Learning Objectives

- 1: Coronary artery kink from Coronary artery tortuosity / fibromuscular dysplasia is a rare but potential cause of Myocardial infarction / Ischemia.
- 2: Management of coronary artery kink is controversial. Stenting the kink could lead to shifting the kink proximally requiring additional PCIs.

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Tables and/or Figures



## Melanotic schwannoma of the spine with leptomeningeal involvement: Case Report.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

Melanotic Schwannoma is a rare variant of melanin-producing nerve sheath tumors comprising less than 1% of all nerve sheath tumors. Nerve sheath tumors are generally benign, however 10% can have a malignant transformation. Nerve sheath tumors have an affinity for intradural extramedullary occurrence, however intramedullary tumors are extremely rare and are difficult to treat. There has been only 10 case reports published, so far.

#### Case Presentation

We present a case of 70-year-old Caucasian female with history of stage 1 lung cancer s/p stereo-tactic radiation therapy and recurrent melanotic schwannoma of the spine s/p radiotherapy and resection of tumor along T7-8, L4 and S1 subsequently, presents with diffuse enhancement of the dura on brain imaging to an oncology follow up, with her husband. Patient has had one-week onset of acute left LE weakness, increased somnolence and worsening of her memory. On examination, patient was drowsy and, oriented only to person and place. Patient was not toxic appearing and demonstrated no aphasia or dysarthria. Patient was lethargic and slow to respond to questions. Cranial nerves were grossly intact with decreased muscle strength throughout, with pronounced weakness noted in the left LE. There were no signs of muscle atrophy, muscle rigidity or sensory deficits. Main differentials included CNS tumors, CVA, hypoglycemia, viral or bacterial meningitis and metabolic encephalopathy.

Subsequent MRI demonstrated bilateral symmetric cortical leptomeningeal enhancement, involving supra and infratentorial regions with dilated ventricles. Blood works were essentially normal except a mild leukocytosis. Lumbar puncture was done and cytology with viral panel was unremarkable. Neurosurgery was consulted and a right frontal sheath guided brain biopsy revealed melanotic neoplasm with a bland spindle cell component, epithelioid morphology and high Ki-67 index. Lesion showed SOX10, Melan A and Olig2 expression with weak S100 labelling. Cytological profile of the tumor was similar to spinal tumor cells done an year prior. A diagnosis of Metastatic Melanotic schwannoma of the spine with leptomeningeal involvement was made.

#### Treatment & Prognosis

No specific guidelines exist for the management of intramedullary melanotic schwannoma due to its rare occurrence. Complete surgical excision of tumor is recommended whenever possible. Other treatments include immunotherapy, based on melanoma protocols and molecular testing of the tumor. Gamma knife surgery including fractional radiation is an equally effective treatment option for small and medium sized schwannomas near any vital structures. Carboplatin/Etoposide are identified as possible chemotherapeutic regimen in malignant peripheral nerve tumors; however chemotherapy does not seem to provide any mortality benefit overall.

#### Outcome

Based on Karnofsky Performance Status, patient was not an ideal candidate for aggressive therapy including radiation therapy and/or intrathecal chemotherapy. All the possible treatment options were discussed with the family. Family chose to enroll her in hospice and patient was later transferred to rehabilitation facility for palliative care.

**Learning Objectives**

1. Melanotic Schwannomas (MS) are a group of rare melanin producing neoplasms arising from the neural crest cells, accounting for less than one percent of all melanin producing nerve sheath tumors.
2. Currently, there are no established guidelines for the management of intramedullary melanotic schwannoma.
3. MRI remains the best imaging modality for diagnosing melanotic schwannomas with complete surgical excision of tumor is recommended whenever possible.

## An unusual cause of abdominal mass in a diabetic patient

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

An estimated 34 million people suffer from Diabetes Mellitus (DM) in the United States. Diabetes management includes lifestyle modifications, oral hypoglycemic agents or subcutaneous insulin injection. The most common reported skin complications with chronic subcutaneous insulin injection are lipoatrophy and lipohypertrophy. In rare cases, patients can develop localized amyloidosis which can result in reduced insulin absorption in the affected site and lead to uncontrolled glucose levels.

#### Case Report

Here we report a 59 year old Hispanic male with a past medical history of Type II DM who presented with progressively increasing mass for more than a year. The mass started as a small bump at the insulin injection site in the mid-abdominal wall above the umbilicus and enlarged to 11cm in diameter over 5 years.

He denied any associated discomfort, pain or discharge. On physical examination, the mass was hard, mobile, non-tender and without erythema. Labs were unremarkable. CT of the abdomen showed an intermediate density lesion in the subcutaneous tissues of the ventral abdominal wall measuring up to 11 cm in diameter. A core biopsy of the abdominal mass was stained with Congo-red and showed amyloidosis. A bone marrow biopsy ruled out plasma cell disorders and systemic amyloidosis. Liquid chromatography tandem mass spectrometry (LCMS) was performed on the biopsied tissue and was consistent with A<sub>1</sub>ns (insulin) type amyloid deposition.

#### Final/Working diagnosis

Insulin-derived amyloidosis is a skin related complication that can arise in insulin requiring diabetic patients. A hard subcutaneous amyloidosis mass which is also known as "insulin ball" is formed secondary to repetitive administration of insulin at the same injection site. Patient was instructed to avoid further insulin injections at the site and to limit using only one site for insulin administration.

#### Learning Objectives

Include localized amyloidosis as one of the differentials for localized subcutaneous mass in insulin dependent diabetic patients

## An Unusual Case of Epithelial-Myoepithelial Carcinoma of The Kidney: Primary vs. Metastasis? A Diagnostic Dilemma.

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction

Epithelial-myoepithelial carcinoma (EMC) is a rare low-grade malignant biphasic tumour that typically arises from the salivary glands, representing less than 1% of salivary gland tumours. It predominantly affects the parotid gland with very few reported cases of distant metastasis. So far, only one reported case of a primary EMC-like renal tumour was found on literature review. We report an extremely rare case of a right kidney epithelial-myoepithelial carcinoma in a patient with a history of parotidectomy for a parotid gland tumour over 30 years prior to presentation. The question remains; is this a new variant of a primary renal malignancy or a rare late renal metastasis of a formerly resected parotid gland tumour?

#### Case Presentation

This is the case of a 62-year-old Caucasian female former smoker with a history of right parotidectomy for a “reportedly benign” tumor over 30 years prior, admitted at our hospital for ischemic bowel and found to have an incidental solid mass arising from the lower pole of the right kidney measuring ~5.6 cm on contrast-enhanced CT scan. No other suspicious lesions or lymph nodes were identified. The patient was initially evaluated by Urology and required to follow-up outpatient after treatment of ischemic bowel. On re-evaluation three weeks later, the mass was noted to have increased in size by ~2cm on repeat CT scan. Patient underwent a radical right nephrectomy. Pathology results were consistent with epithelial-myoepithelial carcinoma concerning for possible metastasis from a salivary gland tumour. PET CT scan post nephrectomy showed no evidence of regional lymphadenopathy or metastatic disease.

#### Working Diagnosis

Based on an extensive literature review, only one case of EMC-like renal tumour showing a perivascular pseudorosette-like pattern has been reported. EMC and variants have not yet been integrated among known forms of renal cell carcinoma (RCC). In this case, the solitary and solid nature of the kidney neoplasm, as well as its rapid increase in size, raises concern for a primary renal malignancy as opposed to a metastasis. Also, our patient’s parotid tumour resected over 30 years prior was “reportedly benign” with no available documentation for confirmation. Could a “reportedly benign” or “supposedly malignant” parotid tumour resected over 30 years prior metastasize to the kidney as a solid solitary mass? The findings of no metastatic lesion or regional lymphadenopathy on PET CT scan makes the possibility of a kidney metastasis unlikely. Interestingly, if considered primary; this will be the second reported case of primary EMC-like renal tumour and if considered metastatic; this will be an extremely rare late renal metastasis of a remotely resected parotid gland tumour. This case highlights an extremely rare malignancy presenting in the unique setting of a remote tumour resection with questionable correlation.



#### Management/ Follow-up

Patient is currently status post nephrectomy and pathology reports from the specimen revealed epithelial-myoeplithelial carcinoma. Patient at this time is in remission with no evidence of active disease with repeat imaging studies. Patient continues to follow up with a local oncologist.

#### Learning Objectives

- Prevalence of epithelial-myoeplithelial carcinoma in the general population
- Management of Epithelial-myoeplithelial carcinoma
- Possibility of remote metastatic disease

## Double Trouble: Pulmonary Venous Thrombosis in the setting of Factor V Leiden Mutation

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

Pulmonary vein thrombosis (PVT) is a rare and fatal condition if not recognized early that often presents with nonspecific symptoms such as cough, dyspnea, or hemoptysis. Etiological mechanisms include vascular torsion or direct injury (major trauma, post-surgical). Diagnosis is made with pulmonary angiography, ventilation-perfusion scans, MRI, and transesophageal echocardiography. Currently, there are no established guidelines for optimal management of PVT other than correction of underlying conditions.

#### Case Presentation:

A 73-year-old Caucasian male with past medical history of COPD, emphysema, occupational exposure to chlorine and ammonia and history of multiple incidental pulmonary nodules (stable over 16 months) presented with complaints of progressively worsening shortness of breath and wheezing over 2 weeks. He did not use oxygen at home and was a lifetime non-smoker. He denied chest pain, leg swelling or pain. In the ED, vitals were significant for hypertension 162/92 and SpO<sub>2</sub> 89% on room air. VBG showed hypercapnia (pCO<sub>2</sub> 56.6). Physical exam was unremarkable except bilateral wheezing on auscultation. CBC, CMP and cardiac panel enzymes were within normal limits. Pulmonary CTA was negative for pulmonary artery thromboembolism but did show multiple stable pulmonary nodules and a thrombus in the pulmonary vein supplying the right lower lobe.

#### Working Diagnosis:

Given concern for a hypercoagulable state homocysteine, protein C, protein S, and factor V Leiden mutation testing was performed. CT abdomen and pelvis was performed which was negative for malignancy. Patient was found to have heterozygous factor V Leiden mutation.

#### Management/Outcome:

Patient was placed on IV heparin following pulmonary CTA results and vascular surgery consulted. There was no indication for acute surgical intervention. On day 3 of admission, the patient was transitioned to oral anticoagulation with apixaban. Patient was discharged home upon stabilization and return to baseline. Pulmonary CTA was repeated 3 months following discharge which showed resolution of PVT.

### Learning Objectives

1. This case describes the importance of being vigilant for rare conditions and identifying the underlying etiology. PVT is a rare condition without any exact data for prevalence.
2. PVT usually occurs from a provoking condition as in this case, factor V Leiden mutation.
3. PVT can have fatal outcomes if not diagnosed and treated appropriately in a timely fashion.

## The Limited Use of Mycoplasma IgM Antibody Testing in a Rural Hospital

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Background:** There have been multiple instances where antibiotics have been used in the treatment of *Mycoplasma pneumoniae* based solely on IgM antibody testing. Studies suggest PCR testing has a higher sensitivity and specificity for detecting mycoplasma although mixed results exist.

**Objective:** In patients living in a rural community, determine the usefulness of IgM antibody testing when compared with a Respiratory Viral Panel (RVP) to diagnose and treat mycoplasma pneumonia.

**Design:** Conduct a retrospective chart review between 2017-2019 of patients who received both a mycoplasma IgM antibody test and respiratory viral panel to determine their concordance. Tests had to be performed within 24 hours of each other.

**Setting:** Rural hospital in Southwest Virginia (Norton Community Hospital)

**Data sources:** Soarian Electronic Health Record

**Data extraction:** Compiled by in-house lab department on excel. Data was reviewed, extrapolated and synthesized by authors.

**Results:** 672 respiratory viral panels with mycoplasma IgM antibody tests were performed between 2017-2019. 72 had positive IgM results with negative RVP results. One test was congruent with a positive RVP and IgM.

**Limitations:** Some patients had repeat testing throughout the 3-year span. Clinical presentation, demographics, and age were not taken into consideration.

**Conclusions:** Based on a 3-year data review, mycoplasma IgM antibody testing has a high discordance with mycoplasma PCR testing.

**Implications:** Mycoplasma IgM antibody testing may have limited utility in the diagnosis and treatment of *Mycoplasma pneumoniae* in the rural Southwest Virginia region.

**Primary Funding:** Norton Community Hospital Internal Medicine Residency Program. No outside funding sources.

### Learning Objectives

Discuss recent guidelines and management of *Mycoplasma pneumoniae* and contrast the differences between Mycoplasma IgM antibody testing and PCR testing.

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<b>Category</b>	Medicine & Medical Subspecialties

**Abstract**

**Introduction**

Parkinson's disease is a progressive neurodegenerative disease that imposes a serious mental, physical, and emotional toll on a patient's well-being. The primary treatment for PD is dopaminergic drugs that help treat motor dysfunction [1]. However, continuous use of these drugs over long periods of time can lead to serious adverse side effects and do not treat the non-motor symptoms of the disease [1]. Osteopathic manipulative treatment (OMT) has been explored as an alternative, non-invasive treatment for patients with Parkinson's Disease (PD). OMT itself is effective at decreasing pain, increasing the range of motion of rigid joints, improving posture, gait, and balance [2]. Accordingly, previous studies have demonstrated that OMT has a positive effect on gait, balance, and motor function in PD patients [2, 3, 4]. OMT's specific effect on PD patients with lower limb muscle rigidity has been minimally researched. OMT provides a holistic approach to PD and is a safe non-invasive treatment with minimal side effects. Considering its potential benefits and limited research, OMT needs to be investigated further as a valid therapeutic option for patients with PD.

**Case Presentation**

Our patient was a 65-year-old- Caucasian male. The patient was seen over multiple visits, typically scheduled 2-3 weeks apart. Upon arrival, the patient was unambiguously restricted in mobility. He presented initially with stabbing pain and stiffness in the right foot, ankle, and Achilles tendon. Pain scale and range of motion were assessed at the beginning of each visit. He reported localized numbness, tingling, and that the pain was worse during ambulation. Physical exam revealed limited range of motion in dorsiflexion of the right ankle. Erythema and edema were documented around the right ankle. The patient had a tailored medication regimen for PD in addition to blood pressure medication.

Primary osteopathic treatments targeting the rigidity included muscle energy and articular techniques. Myofascial release, balanced ligamentous tension, direct inhibition, and cranial manipulation were used for other somatic dysfunctions. Pain scale and range of motion were assessed after each visit at the beginning of the following treatment.

Pain scale, goniometer assess right ankle dorsiflexion, and subjective information from the patient were the primary means of data collection. Data was recorded on the patient's medical charts, which have been retrospectively analyzed and interpreted.

**Final/Working Diagnosis**

During the initial visit, the patient rated his pain a 2/10. The range of motion assessed of the right ankle was severely restricted compared to the left. Measurement with a goniometer showed 9-10° dorsiflexion of the

right ankle prior to treatment. Immediately after treatment dorsiflexion improved to 20°. During the second visit, the patient reported 0/10 pain and felt a significant improvement in function of his right lower extremity after his previous visit. Initial goniometer assessment showed 18° dorsiflexion prior to treatment, indicating his original treatment had maintained his range of motion. On his subsequent follow-up visits, the patient stated the pain had completely resolved and that he was able to begin exercising without restrictions originally caused by his right ankle.

#### Management/ Outcome/and or Follow-up

This case demonstrates that OMT is a beneficial adjunctive treatment for patients experiencing muscle rigidity caused by PD. The patient experienced resolution of pain, increased range of motion and improved function in the lower extremity. Hence, OMT should be considered a viable treatment option for patients experiencing muscle rigidity from PD. Limitations of this study exist, including a case study design and subjective data. However, past studies corroborate our findings. For example, Wells et al. (1999) demonstrated that using ME and articular techniques improved stride length, limb velocity, and upper extremity swing [3]. The benefits experienced by this patient and supporting literature warrant future studies with a larger sample size to validate OMT and its use in PD.

#### Learning Objectives

- Describe how this case study has further helped demonstrate how OMT can help with muscle rigidity in Parkinson's patients.
- Identify which two osteopathic techniques were most effective in this study at helping relieving muscle rigidity in this Parkinson's patient.

#### References:

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## Apical Takotsubo Cardiomyopathy in Young Female with Bipolar Disorder – A Rare Case Report

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Takotsubo cardiomyopathy (TCM) is a rare condition with incidence of 0.02% [1] of all hospitalizations in the United States and occurs in approximately 1-2% [2] of patients presenting with troponin-positive suspected acute coronary syndrome. TCM is caused primarily by catecholamine excess, microvascular dysfunction, and coronary artery spasm mostly in elderly women with history of smoking, alcohol abuse, anxiety states, and hyperlipidemia.

We present a young female with medical history of bipolar disorder who presented with TCM. Prevalence of TCM in young female with bipolar disorder is very scarcely reported in medical literature.

**Case report:** A 40 year-old Caucasian female was brought in by EMS to ER with substernal chest pain 9/10 intensity, 4.5 hours of duration, associated with nausea and vomiting. She received nitroglycerin and morphine en route. Patient denied any stressors and she did not use inhalers prior to calling EMS.

Her Past history is significant for bipolar disorder, Generalized Anxiety disorder, Hypertension, DM, COPD, HLD, Gout, Nicotine dependence. Patient underwent Cardiac catheterization in 2014 and no stents were placed. On presentation her vitals were BP 143/102, HR 124bpm, RR 37, T 98.8F, O2 sat on 2 L nasal cannula 95%. Physical exam did not show heart murmurs, rubs, gallops, friction rub, JVD, carotid bruit, peripheral edema, cyanosis, pulse deficits, no rales, rhonchi or wheezing.

Initial evaluation showed ST segment elevations in leads v6, I II, III, AVF and ST depressions in AVR on EKG and elevated troponin, which prompted treatment for STEMI. Cardiac catheterization showed no significant coronary occlusions and left ventriculogram was consistent with a Takotsubo ventricle with reduced ejection fraction of 25%. Follow up Transthoracic Echocardiogram confirmed the diagnosis of TCM. Follow up EKG showed T wave inversions in v3, v4, v5.

**Management:** Following TCM diagnosis patient was started on Entresto 24/26 mg, Eliquis 5 twice a day, metoprolol ER 25 once a day. Patient is to follow up in 2 weeks with cardiology as outpatient.

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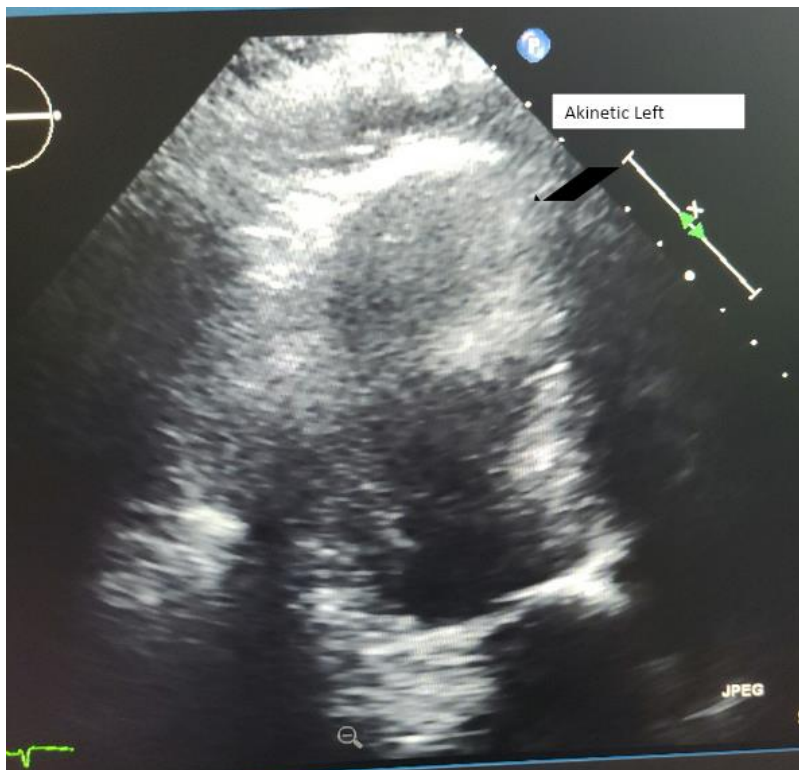
### Learning Objectives

1. Takotsubo Cardiomyopathy is not confined to elderly population and can be seen in young female adults
2. Psychiatric conditions seem to be predisposing factor for development of TCM
3. Apical type of TCM is the most prevalent form of TCM with seen in 81.7 percent of patients in the International Takotsubo Registry study

Tables and/or Figures

Troponin I - History

Date	Time	Result	Units	Reference	
7/2/20	03:53	38.900 H Δ	ng/mL	0-0.034	
7/1/20	22:43	33.400 H Δ	ng/mL	0-0.034	
7/1/20	15:15	13.800 H Δ	ng/mL	0-0.034	
7/1/20	11:08	0.756 H	ng/mL	0-0.034	



## Idiopathic no more: A rare cause of late presentation thrombocytopenia

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

Myriad quantitative and qualitative platelet disorders are recognized in the medical literature. However, in the majority of cases patients are labelled as immune thrombocytopenic purpura (ITP), when the basic tests are unrevealing. Here, we present you a case report of a mislabelled immune-thrombocytopenic-purpura (ITP), which on further investigation revealed the diagnosis of possible two rare genetic functional platelet disorders with the presence of novel genetic mutations.

#### Case Presentation:

History: A 74 year old female with a lifelong history of multiple hospitalizations due to recurrent bleeding manifestations in the form of menorrhagia and upper GI bleed secondary to small-bowel arterio-venous malformations with a labelled diagnosis of refractory ITP, who was treated with chronic steroids, IVIG, and splenectomy at the age of 72 admitted to our hospital for melena and symptomatic anemia.

Physical Examination: negative for petechiae, purpura, cardiac murmurs, signs of liver failure, but non-bleeding external hemorrhoids were noted.

Differential Diagnosis: Acute GI bleed from AVMs, acute flare of ITP, DIC, and underlying undiagnosed functional platelet disorder.

Diagnostic work-up: hemoglobin 7, platelets 36K, with normal MCV, INR, PTT, iron profile, haptoglobin, LDH, fibrinogen, bleeding time, liver and renal function tests. Peripheral smear showed low platelet counts, but no megakaryocytes or schistocytes were noted. USG abdomen revealed cirrhotic changes most likely secondary to hepatitis C. Upper GI endoscopy revealed small bowel AVMs. Colonoscopy revealed non-bleeding hemorrhoids with no angiodysplasia. Von-Willebrand multimer panel revealed elevated Von-Willebrand antigen (VWA) of 514%, elevated ristocetin cofactor assay of 507% with normal VonWillebrand multimer pattern and distribution bands. Platelet function genetic testing revealed homozygous frameshift mutation in chromosome 17 leading to GP1BA protein truncation, heterozygous insertion variant mutation in exon 2 of GP1BA, and heterozygous missense mutation in thromboxane A2 gene, and mutation of glycoprotein 6.

#### Final Diagnosis:

Elevated VWA and normal multimer pattern in the setting of thrombocytopenia seen in our patient is consistent with Type 2B Von-Willebrand disease. Platelet Functional Analyzer further consolidates the diagnosis of Type 2B Von-Willebrand disease and potentiates the diagnosis of suspected Bernard-Soulier disease given patient's longstanding history of associated arterio-venous malformations.

#### Management:



Patient was stabilized with blood transfusions, platelet transfusions, and aminocaproic acid injections. Desmopressin is contraindicated as there is no quantitative defect in the VWA and multimers. Despite no specific therapy available for these diseases, treatment with IVIG, steroids, and desmopressin can be avoided to reduce their complications as no benefit is proven in these diseases.

**Learning Objectives**

Upon completion of this lecture, learned should be better prepared to evaluate the underlying cause of thrombocytopenia

## Open versus Laparoscopic Right Hemicolectomies in Pediatric Patients with Crohn's Disease

<b>Presenting Author</b>	Kevin Galvez-Cabezas, Bachelors in Science, Medical Student, MS4, Division of Pediatric Surgery, DeWitt Daughtry Department of Surgery, Leonard M. Miller School of Medicine, University of Miami, University of Miami Miller School of Medicine, Miami, FL
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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Background/Purpose:** Surgical intervention remains an important treatment modality for the management of Crohn's disease in the pediatric population. The objective of this study was to perform a comparative analysis of open right hemicolectomy and laparoscopic right hemicolectomy for management of Crohn's disease in pediatric patients.

**Methods:** The Kids' Inpatient Database (KID) was analyzed for the years 2009 through 2012 utilizing ICD-9 procedure codes for open right hemicolectomy (45.73) and laparoscopic right hemicolectomy (17.33) in patients with Crohn's disease (ICD-9 codes: 555.0, 555.1, 555.2, 555.9). Open and laparoscopic procedures were compared using propensity score-matched analysis (PSMA) of 41 variables, including risk adjustment with Elixheuser comorbidities.

**Results:** A total of 889 patients were identified and 448 open right hemicolectomy and 441 laparoscopic right hemicolectomy patients were propensity score matched for our analysis. 821 cases were included in the cohort (median age=17 years, male=58%, Caucasian=73%). There were zero in-hospital deaths for all patients (0/821) included in the study. Following propensity score matching, open right hemicolectomy (n=380) patients were more likely to have septicemia, respiratory compromise, pneumonia, perforation and/or laceration, complications and require blood transfusions (all,  $p<0.05$ ). Although laparoscopic right hemicolectomy patients (n=441) were more likely to develop post-operative nausea/vomiting/diarrhea ( $p<0.0001$ ), they had a shorter hospital length-of-stay ( $p<0.0001$ ) and lower overall hospital charges and cost ( $p<0.001$ ).

**Conclusion:** Open and laparoscopic right hemicolectomies in KID have similar low in-hospital mortality for pediatric patients with Crohn's disease. However, open procedures are associated with higher morbidity including an increased risk for respiratory complications, surgical complications, need for blood transfusions, and increased resource utilization compared to patients who had laparoscopic procedures.

### Learning Objectives

- 1- Overall comparison between open vs laparoscopic right hemicolectomies in pediatric patients
- 2- Mortality and morbidity difference between both procedures in pediatric patients with Crohn's disease
- 3- Socioeconomic impact of the two procedures for patients and family

## Successful Surgical Treatment of Pigmented Villonodular Synovitis in the Distal Radial Ulnar Joint with Sauvé-Kapandji Procedure: A Case Report

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

#### Introduction

Pigmented villonodular synovitis (PVNS) is described as a rare, benign condition seldomly affecting the wrist, elbow, or hand. Although current literature does not describe a standardized treatment for PVNS, surgical intervention, usually total or subtotal synovectomy, is commonly used to treat the disease. This case is one of the first in evaluating the efficacy of the Sauvé-Kapandji procedure as a treatment modality for PVNS of the wrist.

#### Case Presentation

A 58-year-old, Hispanic male presented with right wrist pain, worsening for several months and reported an unspecified injury to the wrist approximately 1 year prior. Patient was informed about the procedure and elected to proceed. The procedure went without immediate complications. One-month post operative visit revealed decreased pain and swelling. Four-month visit, the patient experienced no residual paresthesia, brisk capillary refill, and 2/4 peripheral pulses. Passive motion of the wrist: 65° extension, 55° flexion, 45° supination, 80° pronation. Supination markedly limited by heterotopic bone formation confirmed with radiograph. Patient elected for follow up procedure to remove the heterotopic bone formation and has been without complication to date.

#### Discussion

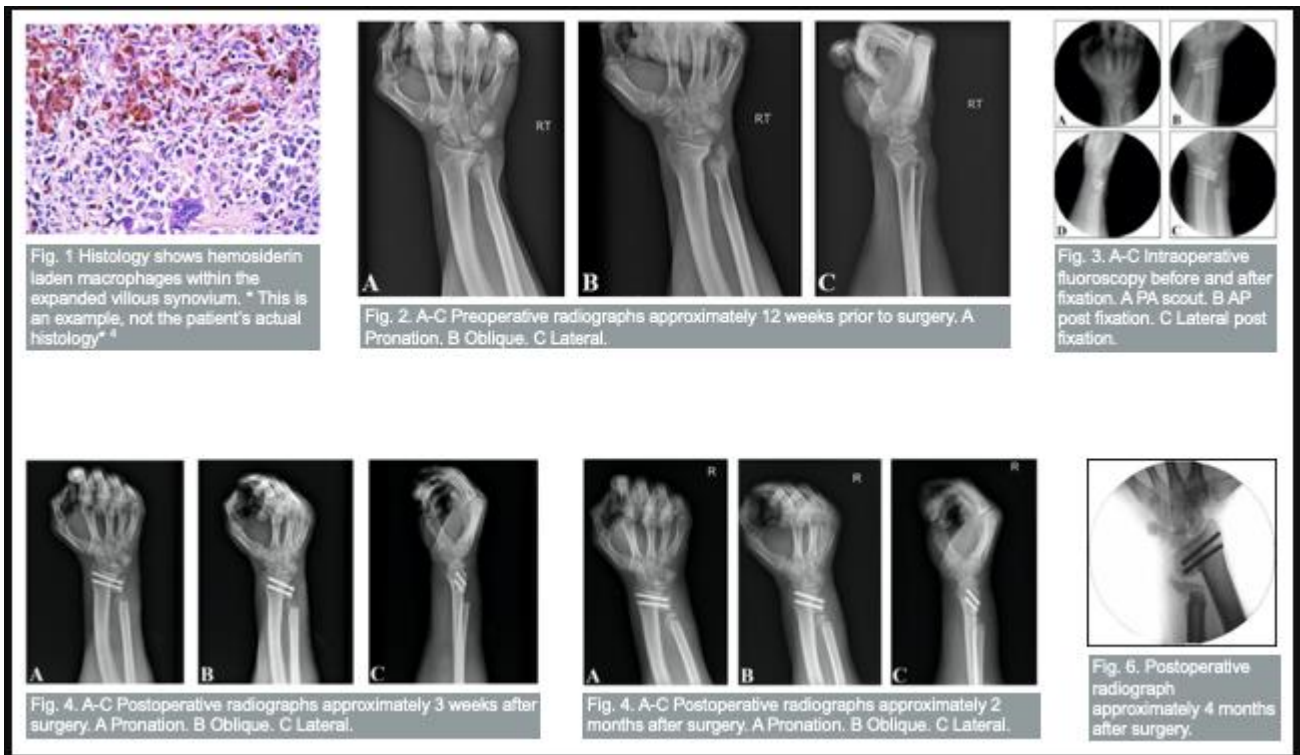
Estimated annual incidence of PVNS in the United States is approximately 1.8 cases per million patients and less commonly affects smaller joints such as the wrist, which make up about 2.53% of all cases. Likely due to the rarity of the disease, there is no standardized treatment for PVNS. In this case, the decision was made to employ the Sauvé – Kapandji procedure with partial extensor tenosynovectomy.

The Sauvé – Kapandji procedure is a form of arthrodesis for the distal radioulnar joint (DRUJ) and is used to treat a myriad of conditions including various DRUJ instabilities and early synovitis in rheumatoid patients. It was elected for this case because of its increased reliability and durability in treating joint disorders. Although PVNS of the wrist is a relatively rare condition with no current standardized treatment, implementation of the Sauvé – Kapandji procedure can lead to favorable patient outcomes.

#### Learning Objectives

Upon completion of this lecture, learners should be better prepared to discuss the pathology of PVNS and one of the treatment options available for these unique cases.

Tables and/or Figures



## Penile Calciphylaxis in a 53 Year Old Male

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

#### Introduction:

Calciphylaxis, or calcific uremic arteriolopathy, is a rare and serious disorder that presents with excruciatingly painful skin ischemia and necrosis. Most commonly, this disorder occurs in the setting of end stage renal disease.

#### Case Presentation:

Patient is a 53 year old male with a history of end stage renal disease (on hemodialysis), coronary artery disease, hypertension, type II diabetes, heart failure with reduced ejection fraction (40%), and HIV who was admitted to the ICU due to diabetic ketoacidosis and found to have a necrotic penis and scrotum. Physical exam revealed a desquamated left hemisphere of the scrotum with exposed subcutaneous fat. Lower extremities reveal bilateral inguinal lymphadenopathy. Differential Diagnosis included Fournier's Gangrene and cellulitis. CT scan of the pelvis revealed significant calcification of the internal pudendal arteries.

#### Working Diagnosis:

Penile Calciphylaxis (Calcific Uremic Arteriopathy)

#### Management:

Partial penectomy with wide excision of necrotic scrotal tissue. Multiple debridement procedures and dressing changes, along with a penile tissue biopsy, until discharge to skilled nursing facility on hospital day 44. Patient is to continue hemodialysis, follow up with general surgeon outpatient, and continue wound care with Calcium Alginate.

### Learning Objectives

1. Discuss the pathogenesis and clinical presentation of calciphylaxis
2. Identify the predominant patient population in which calciphylaxis is present.

## Pediatric Aortic Injury Requiring Emergent Thoracotomy: BB Guns, Safe Child's Play?

<b>Presenting Author</b>	Elizabeth Lafranchise, Medical Student, University of South Florida, Morsani College of Medicine, Tampa, Florida
<b>Co-authors</b>	Michaelia S Sunderland, M.D., General Surgery PGY-4, Department of General Surgery, University of South Florida, Tampa, FL; Audrey Durrant, M.D., Associate Professor of Surgery, Pediatric Surgery Department, University of South Florida, Tampa, FL
<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Introduction:** The leading cause of morbidity and mortality in the pediatric population is unintentional injury. Emergent thoracotomies are rarely performed in pediatric patients, especially in the very young pediatric population. We present a case of a 10-year-old male who survived emergent clamshell thoracotomy for penetrating chest trauma.

**Case Presentation:** A 10-year-old black male presented to the emergency department by ambulance for reported "seizure" like activity at home. Physical examination identified a posterior chest wound and he was quickly moved to the trauma bay. Differential diagnosis included ballistic versus penetrating injury to the chest. Chest radiography was significant for a left sided pleural effusion, mediastinal shift, and a radiopaque foreign body in the mid-chest. He decompensated acutely requiring emergent thoracotomy extended to clamshell thoracotomy for hemorrhage control and aortic repair.

**Final:** Our patient sustained aortic lacerations after being shot with an air-powered rifle by one of his family members. His injury necessitated emergency surgery for a life threatening injury from an object considered a toy. He survived and made a full recovery without any physical or neurologic deficits.

**Outcome:** This case is one of the youngest reported survivors of an emergent thoracotomy. Air-powered gun injuries can be life-threatening despite their perception as safe toys for children. Surprisingly, there is very little regulation on sale of air-guns to minors in the United States. Increased public awareness may help prevent unintentional injury in this population.

### Learning Objectives

Discuss the risks and life threatening injuries that can occur when air-powered guns are used without proper education and pediatric supervision.

Tables and/or Figures

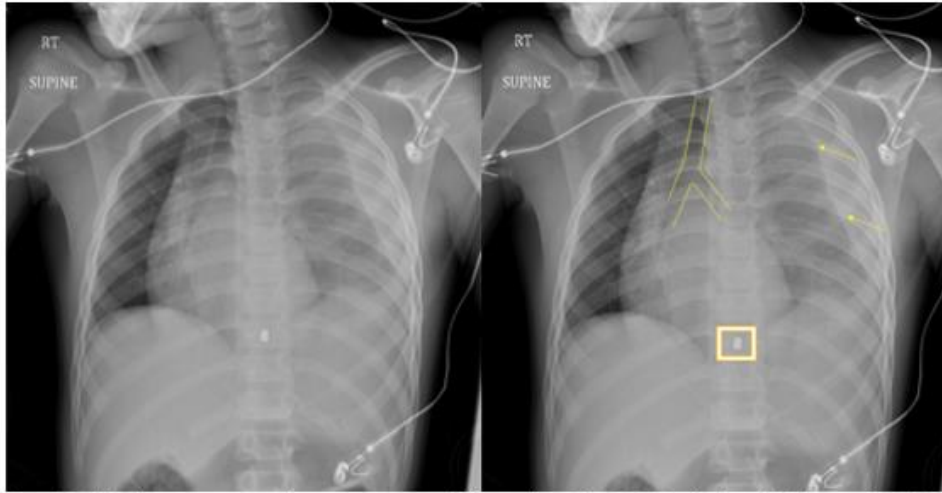


Fig 1: Initial emergency department radiography Fig 2: Mediastinal shift outlined; radiopaque pellet, square

## Spontaneous Bilateral Ectopic Pregnancy: Diagnosis and Management

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Introduction:** While bilateral ectopic pregnancy is increasing in prevalence with assisted reproductive technology use, spontaneous occurrence is less common. Estimated prevalence of spontaneous bilateral ectopic pregnancy is 1 in 200,000. Due to the rarity, diagnosis can be challenging and management of bilateral ectopic pregnancy is not clearly defined and the patient's obstetric history and desire for childbearing must be considered when determining management.

**Case Presentation:** A 33 year old primigravida at 8 weeks gestation by last menstrual period presented to clinic for confirmation of pregnancy. Transvaginal ultrasonography demonstrated a presumed right ectopic pregnancy with cardiac activity. Patient was urgently referred for surgical management. Past surgical history was remarkable for laparoscopic surgery for excision of dermoid cyst, complicated by rupture, followed by chromopertubation to confirm tubal patency. Patient had no other major risk factors for ectopic pregnancy nor use of assisted reproductive therapy. Diagnostic laparoscopy revealed large bilateral fallopian tube masses suspicious for bilateral ectopic. Intraoperative ultrasonography confirmed bilateral ectopic pregnancy.

**Final Diagnosis:** Spontaneous bilateral ectopic pregnancy

**Management and Follow-up:** Bilateral salpingostomy was performed in an attempt to preserve fertility. Post-operatively, pathology confirmed bilateral ectopic pregnancy. Quantitative bHCG levels decreased appropriately and were negative after 8 weeks. Plan for assessment of tubal patency when patient desires conception.

### Learning Objectives

Discuss utility of salpingostomy and salpingectomy in management of ectopic pregnancy.

Consider salpingostomy for management of ectopic pregnancy with contralateral tubal compromise.



## Thoracoscopic Lobectomy after Neoadjuvant Chemoradiation

<b>Presenting Author</b>	Sahil Dayal, BS Biology, BA Chemistry, Brody School of Medicine, MS3, Division of Thoracic Surgery, Brody School of Medicine, Greenville, NC
<b>Co-authors</b>	N/A
<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Background:** Non-small cell lung cancer remains the most common cause of neoplastic mortality in the United States. Surgical resection of early stage non-small cell lung cancer (NSCLC) is recommended as first line intervention, however later stage, advanced local-regional cancers (Stage IIIa) often are treated with neoadjuvant chemotherapy and radiation therapy prior to consideration of surgical resection. Preoperative radiation, and to a lesser extent chemotherapy, increases the complexity of surgical resection due to development of dense inflammatory tissue, edema, and scarring adhesions. The increased difficulty in post chemoradiation therapy (CRT) patients has resulted in slow adoption of minimally invasive techniques for post-neoadjuvant resection. In the past, surgical resection for NSCLC has been proven to be efficacious after CRT, but the available data focuses mostly on open-chest procedures. The aim of our study was to demonstrate that there was no difference in surgical outcomes when performing minimally invasive thoracoscopic lobectomy after neoadjuvant chemoradiotherapy.

**Methods:** An IRB-approved, retrospective analysis of an institutional RedCap database was conducted of 275 patients who underwent lobectomy between the years 2014 and 2019 at a single institution. Baseline variables, demographics, surgical procedure data, pathologic findings, and postoperative outcomes were collected. Statistical analysis of continuous and categorical data was conducted to compare outcomes of patients undergoing thoracoscopic lobectomy with history of neoadjuvant CRT, chemotherapy only, and radiation only to those with no CRT. Statistics were performed using a standard ANOVA for the continuous data and Fischer's Exact chi square test for the categorical data in SPSS.

**Results:** There were no differences between the neoadjuvant CRT, chemotherapy only, and radiation only groups versus no CRT groups with respect to age, gender, BMI, presence of pulmonary disease, presence of cardiovascular disease, preoperative FEV1, estimated blood loss, length of hospital stay, ICU stay, days on ventilator, chest tube duration, presence of air leak, presence of post-op general complications, nor 30 day and 60 day mortalities. There were significant differences between the groups for the demographic categories of preoperative DCLO, smoking history, and current smoking status, and also in postoperative outcomes in the presence of lower rates of post-op pulmonary complications in the radiation only group. See Table 1.

**Conclusions:** There were no significant differences found in surgical outcomes for thoracoscopic lobectomy after neoadjuvant therapies when compared to patients who went directly to surgery. The exception was a lower rate of pulmonary complications seen in radiation only patients, which may be attributable to selection bias, sample size, or the lower rate of current smokers in the radiation only group. In any case, the data indicates that thoracoscopic lobectomy after neoadjuvant chemo/radiation is a safe option for patients with advanced regional non-small cell lung cancer.

### Learning Objectives

- 1) standard of care for NSCLC
- 2) options for treatment of NSCLC

Tables and/or Figures

		No CRT N = 183	CRT N = 22		Chemo Only N = 9		Radiation Only N = 61	
	Variable Analyzed	Result	Result	P-Value	Result	P-Value	Result	P-Value
		ANOVA = Mean (Standard Deviation)						
		X2 = %						
<b>Demographic</b>	Age	64.346 (9.614)	62.286 (11.963)	0.905	66.889 (9.532)	0.949	66.383 (9.426)	0.664
	Female %	53.8	52.4	0.899	33.3	0.229	50.0	0.605
	BMI	28.223 (5.841)	26.558 (5.925)	0.741	26.626 (3.518)	0.934	27.128 (4.749)	0.728
	Pulmonary Disease %	42.9	28.6	0.208	11.1	0.059	33.3	0.192
	Cardiac Disease %	26.9	14.3	0.209	55.6	0.063	33.3	0.340
	FEV1 (% predicted)	77.500 (18.849)	78.813 (14.275)	0.999	76.788 (20.081)	1.000	80.500 (17.653)	0.820
	DCL0 (% predicted)	67.52 (16.91)	55.151 (16.279)	0.046	62.586 (13.724)	0.943	65.552 (16.355)	0.947
	Smoking History %	91.8	81.0	0.107	66.7	0.012	86.7	0.244
	Current Smoker %	48.4	14.3	0.003	11.1	0.029	23.3	0.001
<b>Postoperative Outcome</b>	Estimated Blood Loss (mL)	110.057 (160.492)	109.500 (109.891)	1.000	68.889 (128.787)	0.994	68.509 (82.619)	0.890
	Length of Stay (days)	4.714 (3.317)	4.095 (2.047)	0.981	5.667 (2.179)	0.978	5.400 (7.652)	0.875
	ICU Stay (days)	0.432 (2.134)	0.150 (0.489)	0.981	0.333 (1.000)	1.000	0.350 (2.711)	0.999
	Ventilator (days)	0.273 (1.905)	0.050 (0.224)	0.989	0.000 (0.000)	0.994	0.383 (2.719)	0.996
	Chest Tube Duration (days)	5.060 (5.571)	4.476 (4.854)	0.996	8.889 (7.785)	0.461	6.683 (8.943)	0.491
	Air Leak (days)	1.363 (3.005)	1.095 (2.166)	0.999	5.000 (6.745)	0.181	3.283 (8.465)	0.062
	Post-op Pulmonary Complications %	37.2	38.1	0.938	22.2	0.362	15.0	0.001
	Post-op General Complications %	28.0	19.0	0.381	44.4	0.288	23.3	0.477
	30-day Mortality %	1.6	0.0	0.553	0.0	0.698	0.0	0.317
	60-Day Mortality %	1.7	0.0	0.552	0.0	0.697	1.7	0.996

Table 1. Invasive Groups Compared to No CRT

## Comparing the Effects of Radiotherapy and Rapamycin in PIK3CA Wild Type and Mutant Head and Neck Squamous Cell Carcinoma Cell Lines

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Background/Knowledge Gap:** Upregulated activity of the PI3K/Akt/mTOR pathway is known to correlate with resistance to radiotherapy in solid tumors. PIK3 pathway alterations are one of the most common alterations in Head and Neck Cancer (HNSCC). The role of PIK3CA genetic alterations in differential radiosensitivity and clinical outcomes of HPV positive and HPV negative HNSCC cases have not been addressed to date. In the present study, we tested the effects of radiotherapy and combination effect of radiotherapy and rapamycin in HPV(+) and HPV(-) PIK3CA wildtype (WT) and PIK3CA mutated HNSCC cell lines.

**Methods/Design:** Cell survival of HPV positive (+) UMSCC47 and HPV negative (-) negative SCC40 PIK3CA wildtype (WT) and mutant cell lines treated with Rapamycin and/or radiotherapy was determined by clonogenic cell survival assay, while protein expression of PI3K/AKT/mTOR pathway-related proteins was determined by Western blot.

**Results/Findings:** Rapamycin alone did not reduce significantly the plating efficiency or survival fraction of HPV (+) and HPV (-) PIK3CA WT and mutant HNSCC cell lines. The addition of increasing doses of radiation to Rapamycin pre-treated samples decreased the proliferation capacity of the HPV (+) and HPV(-) PIK3CA WT and mutant cell lines and further reduced the survival fraction. Rapamycin pre-treatment showed an additive effect in sensitizing HNSCC HPV (-) SCC40 WT cells to radiation ( $p=0.045$ ), however this effect was not observed in HPV (+) SCC47 PIK3CA WT and H1047R mutant cell lines ( $p=0.811$  and  $p=0.238$ , respectively), nor HPV (-) SCC40 PIK3CA mutant H1047R and E545K ( $p=0.208$  and  $p=0.399$ , respectively). Also, we found that there was increased phosphorylation of AKT and decreased phosphorylation of pS6 when HPV (+) SCC47 PIK3CA mutant H1047R and E545K cell lines were treated with Rapamycin in conjunction with radiation. In contrast, we found increased phosphorylation of S6 and AKT when HPV (-) SCC40 PIK3CA mutant H1047R were treated with Rapamycin in conjunction with radiation.

Conclusion/Implications: We observed that in vitro, regardless of HPV status, a single mTOR inhibitor (Rapamycin), does not radiosensitize PI3KCA mutant cell lines. In our study, we found higher expression levels of PI3K/AKT/mTOR-related proteins in HPV (-) PI3KCA mutant E545K HNSCC cell line compared with HPV (+) PI3KCA mutant E545K HNSCC (E545K), suggesting that the PI3K/AKT/mTOR signaling pathway might contribute to HPV (-) PI3KCA mutant HNSCC radioresistance.

#### **Learning Objectives**

- Evaluate the in vitro effect of a single mTOR inhibitor (Rapamycin) on tumor cell proliferation and radiosensitization in HPV(+) and HPV (-) PI3KCA mutant cell lines.
- Evaluate the in vitro effect of a single mTOR inhibitor (Rapamycin) in the mTOR pathway proteins in HPV(+) and HPV (-) WT and PI3KCA mutant cell lines

## A Mesenteric Desmoid Tumor Causing Recurrent Intermittent Bowel Obstruction

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Surgery & Surgery Subspecialties

### Abstract

**Introduction:** Desmoid tumors are rare, monoclonal, fibroblastic proliferations that arise in deep soft tissue. These tumors are benign with no metastatic potential; however, they are locally invasive with high recurrence rates. Desmoid tumors are driven by alterations of the Wnt/APC/ $\beta$ -catenin pathway. Sporadic desmoid tumors comprise the majority, 85-90%, and are associated with somatic mutations of CTNNB1. Approximately 10-15% are associated with germline APC mutations in the familial adenomatous polyposis (FAP) syndrome. These tumors make up <3% of soft tissue sarcomas and about 0.03% of all malignancies. Desmoid tumors can arise in any anatomic location, but tend to arise in the extremities, joints, and abdomen. Clinical symptoms vary depending on the location. The treatment of desmoid tumors requires an individualized approach.

**Case Presentation:** We present a case of a 64 year old male who was experiencing intermittent mid-abdominal pain. The pain was described as crampy gas pains. He experienced this pain 3 days prior which resolved spontaneously, and was similar to a previous episode he had 5 years ago. The patient was hospitalized at that time and was found to have a mesenteric mass on CT. He deferred diagnostic laparoscopy then and was discharged when symptoms improved. This hospital course consisted of a CT Abdomen/Pelvis which revealed a partial small bowel obstruction, as well as a slight increase in size of the mesenteric mass now measuring 3.0 x 2.8 cm. The patient was managed conservatively and he was discharged after he had a return of normal bowel function. He agreed to follow up outpatient with general surgery.

**Working Diagnosis:** Outpatient NM/PET scan showed no significant hypermetabolic activity associated with the mesenteric mass, and the chronicity of the lesion could suggest a low-grade malignancy. Intra-abdominal biopsy of the mass was deferred due to the location and potential for complications. A diagnostic laparoscopy was planned with resection of the mesenteric mass.

**Management & Outcome:** The diagnostic laparoscopy was converted intraoperatively to an exploratory laparotomy. A mass of small bowel was identified which was wrapped around its mesentery. Within the mesentery, a small circular mass could be felt. The small bowel mass and mesenteric mass were resected and a subsequent small bowel anastomosis was completed. Pathology findings revealed a densely collagenous hypocellular tumor consistent with a desmoid tumor. The post-op course was uneventful and the patient was discharged on post-op day 4. This case exemplifies the difficulty in diagnosis and treatment of desmoid tumors, specifically those that are intra-abdominal. Diagnostic steps should include a histologic confirmation if it's safe to conduct. When it comes to treatment, there is consensus on a "watch and wait strategy" for newly diagnosed patients with non-life threatening symptoms. When deciding between an active or definitive treatment; the initial tumor size, growth rate, location of the tumor, its risk to organs or nerves or worsening of function, should be weighed. Surgical resection is the recommended treatment for operable intra-abdominal desmoid tumors.

**Learning Objectives**

Become more efficient in the diagnostic work up desmoid tumors

Demonstrate more effective management of patients with desmoid tumors

## Utilizing Osteopathic Manipulative Treatment as a Non-Surgical Approach to Severs Disease in a Growing Adolescent

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction

Sever's disease also known as calcaneal apophysitis is caused by repetitive strain and micro trauma to the secondary ossification center at the Achilles tendon insertion. It often occurs with a pediatric/adolescent rapid growth spurt or sudden increased activity.

Treatment consists of rest, pain medications, and orthotics. If conservative measures are not successful, surgery may be considered. This case describes a patient who was successfully treated with osteopathic manipulative treatment (OMT) for bilateral Severs disease. A literature review revealed no prior studies addressing this.

#### Case Presentation

A 12-year-old female presented to the outpatient OMT clinic with bilateral calcaneal pain for six months, worse on the left. She plays softball and has a history of obesity. X-rays revealed reactive sclerosis of the calcaneal apophysis bilaterally with no fractures or dislocations. The patient was seen by orthopedics, diagnosed with bilateral Sever's disease, and prescribed conservative measures. She had minimal improvement with two months of wearing a boot and rest; orthopedics was considering surgery.

The physical exam revealed bilaterally taught and thickened Achilles tendons with 5/10 pain when palpated. Osteopathic structural exam was notable for numerous somatic dysfunctions affecting both lower extremities, especially the left.

#### Diagnosis

Prior to considering surgery, the patient was treated with OMT. Her structural exam suggested a bio mechanical cause of her pain. Gentle OMT was performed to both lower extremities above and below the ankle with the goal of decreasing muscular hypertonicity and thereby ameliorating traction tension on the calcaneal tendon. The patient was counseled to stretch daily.

#### Outcomes

After the third session, the patient reported her pain went from 5/10 to 2/10. She was able to walk pain-free without her boot, return to softball practice, and no longer required surgery. This case study is incomplete as the patient was lost to long term follow up.

### Learning Objectives

1. Understand the pathophysiology of Severs disease
2. Recognize the biomechanical factors that contribute to Severs disease in growing adolescents
3. Understand how Osteopathic Manipulative Treatment (OMT) can be used to address the bio mechanical components of Severs disease

## Fetal Growth Restriction at term: Outcomes After Labor Induction

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Background:** The etiology of fetal growth restriction (FGR) can be due to suboptimal uterine-placental perfusion. Consequently, concerns arise about growth restricted neonates tolerating labor, particularly by induction. Therefore, this study was performed to examine the success of induction agents in term gestations with FGR.

**Design:** This study was a retrospective analysis. Data was collected from women who delivered neonates with birthweight at less than or equal to 10th percentile for gestation. Student t-test and Chi-square analysis were performed with  $p < .05$  considered significant.

**Results:** 433 medical records were reviewed. Maternal characteristics at labor induction were noted: high BMI of  $30.6 \pm 7.6$ ; EGA of  $38.6 \pm 1.4$ ; chronic HTN (7.7%), pre-existing DM (2.6%); gestational DM (4.6%), gestational HTN or preeclampsia (19.3%), preterm labor (2.4%), PPROM (2.4%); 90 (20.8%) patients were correctly diagnosed with FGR antenatally and 12.2% had abnormal S/D ratio of the umbilical artery. Neonatal outcomes evaluated included: birthweight ( $2423.8 \pm 448.6$  grams), NICU admission (20.8%), RDS (9.5%). Overall, 210 (50.5%) patients had spontaneous vaginal deliveries, 34 (8.3%) had operative vaginal deliveries, 55 (13.2%) had C-sections after labor, and 109 (26.5%) had scheduled C-sections.

A subset of 166 patients who presented for induction of labor with a starting cervical dilation of 0-2cm were analyzed; 36.7% received Misoprostol, 34% received Dinoprostone, 29% received Pitocin for induction; 75.3% had vaginal deliveries, 24.7% failed induction and required cesarean sections. Patients who received Dinoprostone were statistically more likely to have cesarean delivery,  $p < 0.05$ ; 74% of these cesarean deliveries were for non-reassuring fetal heart tracings.

### Conclusion:

Labor induction in women with FGR and even with an unfavorable cervix resulted in a high successful rate of vaginal delivery, regardless of the inducing agents. Women receiving Dinoprostone for induction are more likely to fail induction requiring cesarean delivery than women receiving Misoprostol or Pitocin.

### Learning Objectives

Discuss the different mechanisms of action, limitations, and adverse effects of different inducing agents.  
Discuss the pathophysiology of growth restricted neonates.  
Discuss the knowledge gap on the optimal route of delivery as well as inducing agents for growth restricted neonates.



## Pheochromocytoma, a Mimicker of Hypertensive Disorders in Pregnancy, A Case Report

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction:

Pheochromocytomas, tumors that secrete catecholamines, are exceedingly rare especially in pregnancy. The symptoms of pheochromocytoma are classically described as a triad of episodic headaches, sweating, and tachycardia; approximately 50% will also have paroxysmal hypertension. These symptoms often overlap with symptoms seen in hypertensive disorders of pregnancy such as pre-eclampsia as well as normal physiologic changes encountered in pregnancy; this makes it easy for a pheochromocytoma to be overlooked.

Pheochromocytomas in pregnancy have been associated with a high risk of maternal and fetal morbidity and mortality, so timely diagnosis is imperative. We describe a complicated postpartum course in a patient who is later diagnosed with pheochromocytoma.

#### Case Presentation:

We present a case of a 39-year-old G6P4014 who presented for scheduled repeat cesarean at 38 weeks gestational age. Patient's antepartum course was complicated by gestational hypertension on nifedipine and gestational diabetes on metformin. Cesarean section was overall uncomplicated. The patient's postpartum course was complicated by severe range blood pressures on hospital day 1 with nifedipine dosage increased. Pre-eclampsia workup was performed and was unremarkable with protein/creatinine ratio of 231. On hospital day 2, patient had multiple repeat episodes of severe range blood pressures up to 234/91. At this time, magnesium sulfate was started for seizure prophylaxis and suspected pre-eclampsia with severe features. Soon after initiation of magnesium, patient became hypotensive to 68/37 and magnesium was stopped. Patient's postoperative course continued with labile blood pressures requiring multiple doses of IV antihypertensives; due to poor control, hospital medicine and nephrology were consulted. Broader workup was performed, which included thyroid function tests, cortisol, catecholamines, and metanephrines. Repeat pre-eclampsia labs were performed and unremarkable. Thyroid tests and cortisol returned normal during her hospital stay. The patient remained inpatient with poorly controlled blood pressures, sweating, and flushing. After final adjustment of antihypertensive regimen, the patient was discharged on hospital day 11 on labetalol, nifedipine, and clonidine. Metanephrines and catecholamines were still in process at time of discharge.

#### Working Diagnosis:

Patient's remaining labs returned soon after discharge with elevation of metanephrines at 11,416 mcg/24 hr. She was seen by nephrology in outpatient setting at 10 weeks postpartum and repeat metanephrines remained elevated at 10,487 mcg/24 hr. Symptoms continued with flushing, sweating, and poorly controlled blood pressures for which she was followed closely for. CT abdomen was performed which revealed right adrenal mass measuring 5.5 x 4.4 cm with heterogeneity and cystic areas, highly suggestive of pheochromocytoma.

#### Outcome:

The patient remains stable and on a beta blocker for blood pressure control at this time. Suspicion is high for pheochromocytoma and the patient is scheduled for definitive treatment with adrenalectomy.

**Learning Objectives**

Upon completion of this lecture, learners should be able to more easily identify a secondary cause for hypertension in pregnancy in clinical practice and should be able to differentiate between symptoms of pheochromocytoma in pregnancy and hypertensive disorders in pregnancy such as pre-eclampsia.

## Wrestling Rickets: a rare case of hypocalcemic myopathy and hungry bone syndrome secondary to severe vitamin D deficiency

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction

Vitamin D, calcium, and/or phosphate deficiency can lead to metabolic bone disease and increased risk of fracture. Children and adolescents with dark skin pigmentation and those who lack exposure to sunlight are at greater risk for vitamin D deficiency. Myopathy due to vitamin D deficiency is common and often missed or masked by other diagnoses. Severe vitamin D deficiency typically results in hypocalcemia with hypophosphatemia, rarely with rhabdomyolysis and unexpected hyperphosphatemia. Here, we present an unusual case of hypocalcemic myopathy resulting in hyperphosphatemia and hungry bone syndrome secondary to severe vitamin D deficiency in a young wrestler.

#### Case Presentation

A 16-year-old previously healthy African American male presented with 3-month history of numbness and tingling throughout his body. He was on his high school wrestling team and was on a very restricted diet trying to stay in his weight class. He was found to have calcium of 5.4 mg/dL, phosphorous of 6.1 mg/dL, ionized calcium of 0.77 mmol/L, vitamin D 25 OH of 4.9 ng/ml, parathyroid hormone of 239.8 pg/ml, and creatinine kinase of 978 U/L. Skeletal survey showed severe rickets. He was started on calcitriol and required multiple IV calcium boluses to maintain normal calcium levels. This was suggestive of a component of hungry bones syndrome. Levels of calcium normalized and he was discharged on a regimen of elemental calcium, vitamin D, and calcitriol. We discuss a case of severe hypocalcemia secondary to severe vitamin D deficiency and hyperphosphatemia secondary to rhabdomyolysis as evidenced by elevated CK levels.

#### Working Diagnosis

Hypocalcemic myopathy and hungry bone syndrome secondary to severe vitamin D deficiency

#### Discussion

Vitamin D, calcium, and or phosphate deficiency can result in undermineralized bone and excess osteoid, leading to metabolic bone disease and increased risk for fractures. Vitamin D is converted to calcitriol which binds to vitamin D receptors, controlling calcium and phosphate homeostasis, critical for normal bone remodeling. Acute hypocalcemia presentation can vary from perioral or acroparesthesias, myopathy, seizures, and arrhythmias. Our patient had severe hypocalcemia and vitamin D deficiency with hyperphosphatemia, likely due to the elevated CK from skeletal muscle cell lysis.

Vitamin D deficiency is common in athletes, especially if training indoors, such as wrestlers. Wrestlers may also follow restrictive diets to maintain their weight class. This can have detrimental effects on their health, such as kidney failure, rhabdomyolysis, arrhythmias, or death.

#### Conclusion

Severe and prolonged vitamin D deficiency results in rickets and hypocalcemia with hypophosphatemia. Seldomly severe hypocalcemia results in hypocalcemic myopathy which can lead to rhabdomyolysis and hyperphosphatemia. To our knowledge, there are no previously reported cases of hypocalcemic myopathy with hyperphosphatemia and hungry bone syndrome resulting from severe vitamin D deficiency. Pediatric providers should screen student athletes for restrictive diets and be aware of the potentially severe outcomes of these radical diets.

**Learning Objectives**

1. Identify populations at risk for vitamin D deficiency
2. Discuss complications of Vitamin D deficiency
3. Diagnose a patient with Vitamin D deficiency

## A Unique Case of Severe Neonatal Hyperbilirubinemia

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction

Neonatal Hyperbilirubinemia presents as a common reason for admission to the Neonatal Intensive Care Unit.

Unconjugated hyperbilirubinemia results from physiologic or pathologic causes and results in approximately 75% of cases. Increased bilirubin load arises from a higher red blood cell mass, decreased red cell lifespan, and deficiency of UGT enzyme in the neonatal period. Causes of pathologic unconjugated hyperbilirubinemia include ABO and Rh incompatibility, red cell or enzyme defects. Finally, the presence of conjugated hyperbilirubinemia is always pathologic and may result from bile formation defects or obstruction.

#### Clinical Presentation

We present an AGA full term male who developed respiratory distress, hypotension and hypoglycemia after birth. He was noted to have hepatosplenomegaly at birth and his initial total bilirubin at 8 hours of life was 16.1 mg/dl and direct bilirubin 1.1 mg/dl. He was placed on triple phototherapy on DOL 0. He also received three doses of IVIG and two double volume exchange transfusions. His bilirubin continued to increase to a peak total bilirubin of 35.3 mg/dl on DOL 18 and peak direct bilirubin of 26.6 mg/dl on DOL 16.

The infant had a liver biopsy that demonstrated severe cholestatic pattern of injury with bile duct plugging. Infectious disease work-up including cultures taken at time of biopsy and various viral PCR studies were negative.

#### Diagnosis

A cholestasis panel revealed mutations in four genes associated with sitosterolemia and abnormal plasma sterols.

#### Discussion

Phytosterols induce cholestasis and can cause direct hepatocyte damage. Intralipids worsen this process due to the high percentage of sterols from steroid alcohols in plants. This infant received intralipids until DOL 18, which likely contributed to his extremely elevated peak bilirubin.

Genetics recommended starting formula rich in MCT oil to limit phytosterol concentration. His bilirubin improved and was eventually stable for discharge on DOL 81.

#### Learning Objectives

1. Broaden the differential diagnosis of neonatal hyperbilirubinemia; sitosterolemia should also be considered when administering total parental nutrition with soybean intralipids to infants with worsening cholestasis. This condition improves with modification of diet.
2. Consider sitosterolemia or inadequate plasma sterol metabolism if an infant is demonstrating signs of cholestasis later with the introduction of baby and table foods in a breastfed infant due to the low sterol content in breast milk.

## Maternal Thrombocytopenia: How Risky Is It?

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Background:** Profound thrombocytopenia (platelets  $<50,000/\mu$ ) is associated with hemorrhage morbidity. Risks are less well-defined when platelet counts are less than 50,000 and 100,000. The objective of this study is to determine the extent to which peripartum thrombocytopenia affects maternal and neonatal outcomes.

**Methods:** Retrospective chart review of thrombocytopenic women who delivered at Tulane-Lakeside Hospital between 2012 and 2016 was completed. Measured outcomes included maternal demographics, medical conditions, and platelet count; intrapartum and postpartum analgesia; neonatal platelet count, and neonatal outcomes. Descriptive and comparative analyses with Chi-square and Student's t-test were performed.

**Results:** 497 women met inclusion criteria. The most common adverse maternal medical condition was preeclampsia with severe features (8.7%). The most common adverse neonatal outcome was neonatal intensive care unit (NICU) admission (14.3%) and hyperbilirubinemia (14.3%). Maternal thrombocytopenia at the time of delivery was associated with older maternal age (29.6 +/- 6.8 vs. 26 +/- 5.3 years,  $p=0.02$ ), earlier gestational age at delivery (38.0 +/- 2.8 vs. 38.6 +/- 1.3 weeks,  $p<0.001$ ), preeclampsia with severe features (23.1% vs. 6.5%,  $p<0.001$ ), and fetal growth restriction (17.9% vs. 5.6%,  $p=0.026$ ). Additionally, a low maternal platelet count was associated with requiring general anesthesia (10.5% vs. 1.5%,  $p=0.004$ ), and avoidance of NSAIDs postpartum (49.5% vs. 29.2%,  $p=0.001$ ). Maternal hemorrhage and neonatal thrombocytopenia were not detected among those with thrombocytopenia (2.6% vs. 8.4%,  $p=NS$  and 10.3% vs. 5.6%,  $p=NS$ ). Neonates born to thrombocytopenic mothers were more likely to require evaluation for sepsis (20.5% vs. 5.6%,  $p=0.029$ ).

**Conclusion:** Maternal thrombocytopenia is associated with older maternal age, younger gestational age at delivery, preeclampsia with severe features, fetal growth restriction, and evaluation for neonatal sepsis. Low platelet count at the time of delivery increased chances of receiving general endotracheal anesthesia. Maternal thrombocytopenia is not associated with maternal hemorrhage or neonatal thrombocytopenia.

**Learning Objectives**

Describe etiologies of thrombocytopenia in pregnancy.

Describe the possible association of thrombocytopenia with maternal and neonatal morbidity.

Discuss the effects of thrombocytopenia between 100,000 and 150,000 on maternal and neonatal outcomes as risks in this range are less well-defined

## Gabapentin in post cesarean pain management

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Background:** To determine whether adding gabapentin to standard post cesarean delivery (CD) pain regimen would decrease overall opioid usage.

**Methods:** Retrospective chart review on data from women who underwent CD January - May 2018. Patients who received general anesthesia for CD, had contraindications to NSAIDs, or history of opioid dependence were excluded. Primary outcomes assessed include quantity of opioids administered both during hospital stay and on discharge. Chi-square and Student's t-test were performed with  $p < 0.05$  being significant.

**Results:** 203 patients who underwent cesarean delivery were identified; 116 patients (57.1%) received gabapentin postoperatively with a mean + SD of 1,931.9 mg + 557.1 in doses of 300 mg tablet every 8 hours. 87 patients (42.9%) did not receive gabapentin. All patients received a combination of NSAIDs, acetaminophen, and narcotics for pain. Narcotics were converted to morphine equivalents for analysis. Compared to women who did not receive gabapentin, those who did used less acetaminophen (5,041 + 1706.2 mg vs 3,939.2 + 2798.3 mg, respectively;  $p < 0.05$ ) and less morphine equivalents (141.6 + 176.6 mg vs 96.3 + 63.4 mg, respectively;  $p < 0.05$ ). There was no statistically significant difference in usage of ibuprofen between groups (5195.2 + 1504.1 mg vs 4,945.6 mg + 3,009.0 mg,  $p = \text{NS}$ ) or reported pain scores (4.0 + 1.5, 4.5 + 1.4, 4.5 + 1.7 versus 4.1 + 1.6, 4.2 + 1.4, 4.1 + 1.5; day 1, day 2, day 3 respectively,  $p = \text{NS}$ ). Quantity of prescribed narcotic tablets at discharge were statistically lower in the gabapentin group (19.9 + 7.7 versus 24.7 + 6.1;  $p < 0.001$ ).

**Conclusion:** The addition of gabapentin to standard post CD pain regimen decrease the overall opioid usage without increasing the pain scores, but may be underutilized due to physician education and recent changes in opioid prescribing practice.

### Learning Objectives

1. Discuss the prevalence of persistent opioid use among opioid-naive women who underwent cesarean delivery.
2. Discuss the magnitude of this problem as there is a high prevalence of cesarean delivery in the United States
3. Discuss the mechanism of action of Gabapentin in post surgery pain management



## A Traveling Soccer Player with Groin Pain

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<b>Disclosure Information</b>	Author has no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Introduction:** Groin pain is a common symptom in athletes that can be challenging to treat. Sports related injury rates in the groin are estimated to be 8-25% of all injuries.[1] Pubic osteitis can be the cause of groin pain in athletes and has a general prevalence ranging from 0.5-6.2%. The repetitive trauma alone or in conjunction with opposing shearing forces across the pubic symphysis is likely the main contributing factor in many athletes especially those in soccer, football, and ice hockey.[2] Not all cases of groin pain are straight forward and when athletes present with systemic symptoms further detailed evaluation is warranted.

**History:** A 16-year-old male presents to the ER with hip and groin pain for the past 1 month. He reports sharp shooting pain associated with exercise, walking, and standing for a prolonged time and a constant dull ache while at rest. The pain radiates to his lower back, hips, groin, and legs. He reports feeling weak and now is having difficulty with ambulation. Throughout the course of gradual worsening musculoskeletal pain, the patient develops intermittent fevers, chills, sweats, and recalls weight loss.

**Physical Exam:** Vital signs are normal. The exam is significant for tenderness to palpation over his paraspinal muscles in the lumbar spinal region(L>R), mild tenderness over vertebral processes of L4-L5. Tenderness to palpation of bilateral thighs, ASIS, and pubic symphysis. 2/5 strength with hip flexion bilaterally due to pain. He can flex hips to 110 degrees but has significant pain beyond that point. He has pain with abduction, adduction, internal and external rotation of the legs. Sensation intact. 3+ patellar reflex bilaterally. Patient with antalgic gait and prefers walking with straight legs.

**Diagnostic Evaluation:** Patient underwent extensive evaluation in the emergency department and inpatient. Evaluation included normal CMP, CK, UA, and urine culture. CBC significant for normocytic anemia. Elevated inflammatory markers with an ESR at 94 and elevated CRP at 4.57. Blood cultures x2 are negative. Urine gonorrhea and chlamydia negative. TSH and free T4 normal. Extensive rheumatologic workup unremarkable. LDH and uric acid normal. Imaging included normal testicular US, CT brain without contrast, pelvic x-rays with frog leg, and CXR. MRI spine showed non-specific decreased bone marrow signal. MRI pelvis significant for symphyseal injury, extensive edema within the soft tissue pelvis with a small amount of hemorrhage, strains of adductors, sacral edema, and injury to the R adductor. QuantiFERON gold assay was positive. Bone biopsy showed inflammatory cells and inflammatory changes, however additional stains including acid fast and specific TB stains were negative.

**Final/ Working Diagnosis:** TB pubic osteomyelitis vs pubic osteitis

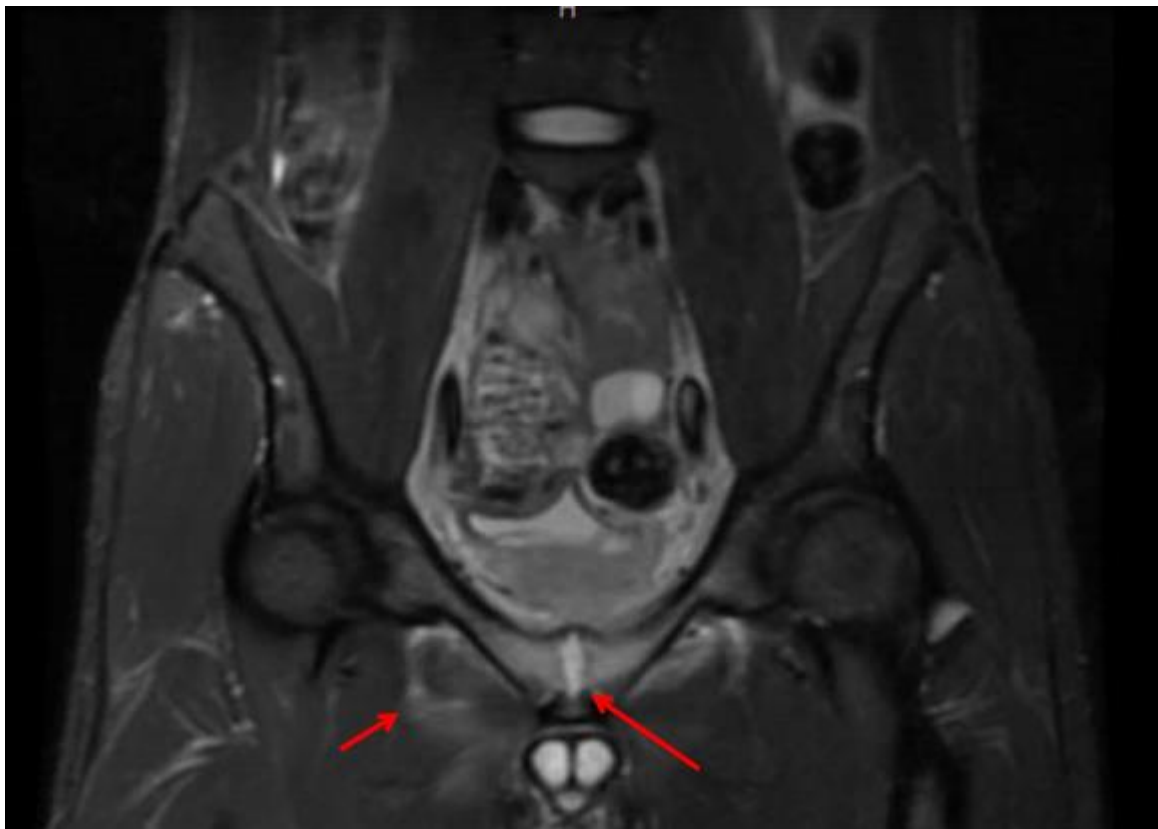
**Discussion/ Outcome:** Pubis osteitis is diagnosed with an MRI of the pelvis which will have evidence of subchondral bone edema. MRI may additionally demonstrate fluid in the pubic symphysis joint and small tears of the adductor muscles. Xrays can be helpful especially in the acute phase to rule out fracture, however, is not diagnostic for pubic osteitis.[3] TB pubic osteomyelitis is a rare condition but has been reported in a small series of case reports.[4] After a detailed review of patient's symptoms, he had developed intermittent fevers, cough, episodes of sweating, and weight loss and had also traveled to the Philippines throughout his childhood. With the combination of historical findings, it prompted a QuantiFERON test which was positive. The patient underwent a bone biopsy which was positive for signs of inflammation but no evidence of bacterial or tubercular specific process. The patient was started on IV antibiotics

initially, but once the QuantiFERON test was positive he was transitioned to TB treatment therapy. The conundrum of the case is whether the patient had pubic osteitis with incidental positive QuantiFERON test suggesting latent TB, or if the presentation was a true TB pubic osteomyelitis. The combination of close follow up, physical therapy, NSAIDS, and TB treatment resulted in symptomatic improvement.

### Learning Objectives

1. Know how to diagnosis pubic osteitis.
2. Remember to include a wide differential when it comes to musculoskeletal injuries in athletes.
3. Remember careful history taking may reveal symptoms that prompt additional testing.

### Tables and/or Figures



## Cerclage Management of Bleeding Cervical Varices During Pregnancy

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<b>Disclosure Information</b>	Author has no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Introduction:** Cervical varicosity is a rare complication of pregnancy. They present as painless vaginal bleeding, mostly during the second or third trimester, potentially leading to maternal and fetal morbidity and mortality. There have only been 18 cases reported in the English literature with varying presentation, and there has been no consensus on the optimal approach to manage cervical varices. Cervical cerclage was placed in three cases, however there were other concurrent indications for them rather than the bleeding cervical varices. We present a case of cervical varix presenting with vaginal bleeding starting in first trimester and directly managed with McDonald cerclage.

**Case Presentation:** Patient was a 29 year-old G1 woman with no known exposure to diethylstilbestrol (DES). Patient experienced two episodes of vaginal spotting at 9 weeks gestation and was advised to practice pelvic rest. Speculum exam at 12 weeks gestation noted non-bleeding cervical varices. Patient continued to experience intermittent spotting the following weeks, though she did not practice pelvic rest. At 14 weeks gestation patient experienced heavy vaginal bleeding which resolved. Patient was subsequently referred for evaluation by Maternal Fetal Medicine (MFM) specialists.

**Final Diagnosis:** Cervical varicose was confirmed as well as varicosity of the lower uterine segment.

**Management/ Outcome/ Follow-up:** Decision was made to perform McDonald cerclage under spinal anesthesia. A persistently bleeding point was successfully tamponade with a single chromic suture. Patient continued to follow up regularly with her primary physician as well as MFM throughout her pregnancy. She was also advised to practice strict pelvic rest. At 19 weeks gestation, transvaginal ultrasound revealed short cervix and cerclage in situ. There was no evidence of low-lying placenta or placenta previa. The patient was started on vaginal progesterone. The cervical length remained short but stable throughout the remainder of her pregnancy. At 32 weeks gestation, patient experienced preterm contractions after vaginal intercourse which resolved with tocolysis. She completed a course of antenatal corticosteroid. The patient did not experience further vaginal bleeding through the remainder of her pregnancy. Cesarean delivery was planned at 37 weeks 6 days gestation. The cerclage was removed at the end of the Cesarean delivery. Cervical varicosity was noted to have resolved at time of cerclage removal.

Our case does not only report a rare obstetric occurrence being cervical varicosity, but our case is also significant in several aspects. Firstly, while most cases of cervical varices were diagnosed with second or third trimester bleeding, our patient presented with painless vaginal bleeding since first trimester. She also does not have other risk factors that have been documented such as DES exposure, placenta previa or increased uterine size. She received a McDonald cerclage as the management method which successfully prevented further bleeding episodes during her pregnancy. The patient was followed closely and regularly throughout her pregnancy with ultrasonography. They patient was delivered at term via planned Cesarean delivery with birth of a healthy infant. Our case report is the first in which cervical cerclage was used to manage bleeding cervical varices during pregnancy without complications and with good maternal and fetal outcomes.

**Learning Objectives**

- Discuss cervical varices as a differential diagnosis for vaginal bleeding affecting pregnancy
- Consider cerclage as a management option to bleeding cervical varices

## A Unique Case of a Twin Gestation with Delayed Interval Delivery of Twin B at Full-term

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction:

The prevalence of twin pregnancies continues to increase. These pregnancies have higher rates of complications including cervical insufficiency, preterm prelabor rupture of membranes, preterm labor, and preterm birth. In cases of pre-viable or extreme preterm delivery of Twin A, attempts to prolong the pregnancy to improve outcomes for Twin B are reasonable. Optimal management of delayed interval delivery has not been established.

#### Case Presentation:

This is a case of a dichorionic diamniotic twin gestation with pre-viable delivery of Twin A at 19w5d gestation. To delay delivery of Twin B, the patient received tocolysis, latency antibiotics, and a rescue cerclage. The patient was subsequently discharged to home with nightly vaginal progesterone. Pregnancy was prolonged an additional 19 weeks with uneventful vaginal delivery of Twin B weighing 2710g with APGAR scores of 8 and 9 at one and five minutes respectively.

#### Final Diagnosis:

Twin gestation with delayed interval delivery of twin B at full-term

#### Management/Outcome/Follow-up:

Delayed interval delivery of Twin B can improve neonatal survival and outcomes. This case adds to the current literature which supports intervention with tocolytics, latency antibiotics and/or cerclage, however no consensus exists. A retrospective multi-center study could achieve the power to make recommendations for optimal management, but would likely be confounded by evolving and improving perinatal care of twin pregnancies. Thus, additional case reports may allow for development of a management consensus.

### Learning Objectives

- To describe interventions that allowed for successful delayed interval delivery of Twin B.
- To raise awareness that despite improvements in the perinatal care of twin gestations, there is still no consensus for delaying interval twin delivery.

## The Novel Use of a Bakri Postpartum Balloon for the Use of Puerperal Uterine Inversion Avoiding Emergency Laparotomy

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Introduction:** Puerperal uterine inversion occurs when the fundus collapses into or even beyond the endometrial cavity, resulting in the uterus either partially or completely turning inside out. It is regarded as a life-threatening obstetric emergency due to severe hemorrhaging. The current treatment recommendations include manually manipulating the uterine inversion and surgical intervention.

**Case Presentation:** We present a case of a 32-year-old female, G2 T1 P0 A0 L1, who was delivering her second child vaginally. The gestational age was 39 weeks and 2 days. Upon admission, she denied nausea, vomiting, fever, chills, and diarrhea.

The patient had an uneventful stage 1 and 2 of labor. After delivery of the infant, the placenta began to deliver. It was also noted that the uterus was inverting. At this point, the placenta was immediately removed in a piecemeal fashion.

**Final/Working Diagnosis:** Once the placenta was removed, heavy bleeding was noted due to a fourth degree inversion and the uterine fundus was returned to the normal position via manual replacement. The maneuver significantly decreased the bleeding; however, the fundus remained hypotonic and would invert again after completion of the maneuver. The final diagnosis was acute puerperal uterine inversion.

**Management/Outcome/and or Follow-up:** Fundal massage and uterine hypertonic agents did not resolve the inversion. Aggressive fluid replacement with IVF, FFP, and PRBC continued but was not successful. The patient was taken to the OR to undergo an emergency laparotomy. In a final effort to avoid surgery, a Bakri uterine balloon was inserted in an attempt to maintain the position of the fundus. While manually maintaining the fundal position, the balloon was inserted through the cervix into the uterus. While 240 cc of sterile saline was inflated into the balloon, the hand was removed from the uterus. This resulted in the Bakri balloon maintaining the fundal position and controlling the bleeding. The patient was monitored for three days with no significant complications. The Bakri balloon was gradually deflated and eventually removed. Thus, the Bakri postpartum balloon may be used in puerperal uterine inversion, avoiding the need for emergency laparotomy.

### Learning Objectives

1. Upon completion of this lecture, learners should be prepared to discuss novel uses for the Bakri postpartum balloon for acute puerperal uterine inversion.
2. Upon completion of this lecture, learners should be prepared to identify the current treatment modalities for acute puerperal uterine inversion.

Tables and/or Figures

Vitals Upon Admission	
Temperature (Oral)	98.3°F
Blood Pressure	120/69
Heart Rate	83
Respiratory Rate	16

Pertinent Labs Upon Admission	
WBC	8.24
Hgb	10.4
PLT	289

## Chorioamnionitis: Correlation between clinical vs histologic diagnosis and maternal and neonatal outcomes

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Background:

Chorioamnionitis diagnosed during labor based on clinical criteria (mainly fever) is aggressively treated with antibiotics to prevent maternal/neonatal morbidity. However, factors other than infection could result in fever during labor. This study aims to determine whether clinically diagnosed chorioamnionitis is histologically confirmed, and thus antibiotics is justified, and to describe maternal/neonatal outcomes from either clinical or histologic diagnosis.

#### Methods:

A retrospective analysis was performed on data collected on patients diagnosed with chorioamnionitis (either clinical or histologic). Student t-test and Chi-square analysis were performed on maternal/neonatal outcomes with  $P < 0.05$  being significant.

#### Results:

395 patients were diagnosed with chorioamnionitis; 36.7% diagnosed clinically and confirmed by placenta histology, 4.4% diagnosed clinically but not confirmed by histology, 15% diagnosed clinically but placenta was not examined, and 50.9% diagnosed by incidental placenta histology. Those diagnosed clinically and confirmed by histology are more likely than those incidentally diagnosed by histology to deliver at older gestation ( $38.2 \pm 2.5$  vs  $37.4 \pm 4.0$  weeks;  $p < 0.001$ ), to have intrapartum fever (77.6% vs 7.0%,  $p 0.000$ ), maternal tachycardia (79.8% vs 53.7%,  $p 0.000$ ), fetal tachycardia (54.5% vs 4.8%,  $p 0.000$ ), maternal leukocytosis (69.7% vs 50.0%,  $p 0.001$ ), uterine tenderness (12.1% vs 0,  $p 0.000$ ), purulent discharge (15.5% vs 2.1%,  $p 0.000$ ), drop in hct postpartum (5.6 vs 4.9,  $p 0.014$ ), and to receive epidural (98.4% vs 88.1%,  $p 0.000$ ), cytotec (20% vs 10%,  $p 0.012$ ), Pitocin (98.4% vs 88.1%,  $p 0.000$ ), internal monitoring (23.9% vs 8.0%,  $p 0.000$ ), and antibiotics (96.8% vs 2.0%,  $p 0.000$ ) but less likely to be GBS carrier (26.9% vs 39.1%;  $p 0.05$ ); their neonates had lower 1-minute Apgar score (5.9 vs 7.1,  $p 0.005$ ), higher NICU admission (85.4% vs 40%,  $p 0.000$ ), sepsis workup (86.7% vs 37.9%,  $p 0.000$ ), and empiric antibiotic treatment (83.3% vs 30.0%,  $p 0.000$ ).

#### Conclusions:

Clinical chorioamnionitis sometimes was not confirmed by histology, pointing to other potential causes for intrapartum fever besides infection. Conversely, many histologic diagnoses of chorioamnionitis were not associated with clinical symptoms, possibly suggesting subclinical chorioamnionitis.

### Learning Objectives

1. Examine the correlation between clinical indicators of chorioamnionitis during labor and histologic diagnosis of chorioamnionitis
2. Recognize antepartum and intrapartum risk factors associated with chorioamnionitis
3. Discuss the implications for empiric treatment with antibiotics during labor when clinical risk factors for chorioamnionitis are present



## Brainstem Encephalitis as the Presenting Symptom of Pulmonary Large cell Neuroendocrine Carcinoma

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

Paraneoplastic Neurologic Syndromes (PNS) are remote effects of malignancy involving the nervous system not related to tumor invasion, compression, or metastasis. These syndromes are rare, with approximately 1% of adults with cancer having an associated PNS. They are immunologic in origin where malignancy triggers production of autoantibodies against various antigens of the nervous system, as antigens located on the tumor mimic those of the nervous system. It is not uncommon for a PNS to be the first clinical manifestation of malignancy, with as many as 80% of patients having no evidence of underlying tumor at initial presentation. Interestingly, tumors associated with these syndromes also tend to be small in size and without metastases. It is well known that there is a strong association between PNS and pulmonary malignancies; however, little knowledge exists regarding their association with pulmonary large cell neuroendocrine carcinoma. LCNEC is an aggressive malignancy associated with a poor prognosis, an estimated 5 year survival rate at 35.3% and a 5 year over all disease free survival estimated at 17.4%, warranting early diagnosis and initiation of treatment. Rarely have these tumors been associated with a paraneoplastic neurologic syndrome as the presenting symptom at diagnosis. Here we present the case of a 72-year old male who presented with new onset bulbar predominant symptoms in the setting of a presumed insignificant 1cm pulmonary nodule, who after extensive investigation was diagnosed with an Anti-Hu associated paraneoplastic brainstem encephalitis with subsequent biopsy confirming pulmonary large cell neuroendocrine carcinoma

A 72-year-old male with a history remarkable for tobacco use presented to the emergency department with complaints of generalized weakness, dysphagia, dysarthria, dysphonia, diplopia, ataxia, and unintentional weight loss, which he had been experiencing for approximately eight weeks. His primary care physician had initiated diagnostic testing with a head computed tomography (CT), chest x-ray, thyroid studies, sedimentation rate, c-reactive protein, lyme titer, and anti-acetylcholine receptor antibodies, all of which were unremarkable. Diagnostic investigation at our institution was initiated with magnetic resonance imaging (MRI) with and without contrast of the brain and stem, which demonstrated chronic microvascular changes. CT of the chest did demonstrate an irregular, branching 1 cm right upper lobe pulmonary nodule with an associated pneumonia and a few enlarged mediastinal nodes. Neurology was consulted and initially suspected a bulbar predominant neuromuscular junction disorder and a trial of pyridostigmine was initiated. This treatment was discontinued due to increased secretions and a lack of clinical response. He was started on intravenous immune globulin therapy with a 2 g/kg daily infusion given over a total of 5 days with only minimal improvement of symptoms. A trial of prednisone was then initiated. Serum testing for voltage-gated calcium channel antibodies, muscle specific kinase (MuSK) antibodies, and acetylcholine binding- blocking- and modulating antibodies were all negative. Lumbar puncture demonstrated cerebral spinal fluid that was clear in appearance, total protein of 126mg/dL, glucose 71mg/dL, 25 red blood cells, 0 white blood cell, and lactate dehydrogenase of 50 U/L. The elevated total protein was suggestive of a central nervous system inflammatory process rather than a peripheral neuromuscular junction process. Biopsy of a mediastinal lymph node confirmed a high-grade large cell neuroendocrine carcinoma. A paraneoplastic panel was obtained and was positive for anti-Hu (ANN1) antibodies.

Shortly after diagnostic confirmation the patient underwent percutaneous endoscopic gastrostomy (PEG) tube placement for progressive worsening of his dysphagia, and shortly thereafter he required intubation for hypoxic respiratory failure. Neurology recommended starting high dose steroids and treating the underlying malignancy; however, before these measures could be initiated his neuromuscular weakness continued to progress and he passed away after comfort care measures were instituted.

After reviewing the literature, the few PNS cases associated with LCNEC that have been described include Lambert Eaton myasthenic syndrome (VGCC antibody mediated), paraneoplastic retinopathy, and Anti-Hu associated syndrome presenting with sensory neuropathy, autonomic dysfunction, and tonic pupils. LCNEC has been rarely associated with Anti-Hu positivity. In one study investigating Anti-Hu positivity in patients with paraneoplastic encephalomyelitis, only 2% were found to have an underlying LCNEC. As to the authors' knowledge, LCNEC presenting as an Anti-Hu associated brainstem encephalitis has not been described. We suspect the rates of these malignancies are underreported given difficulty surrounding their diagnosis as well as their relatively recent recognition as their own separate entity. Unfortunately, limited data exists regarding their association with PNS. This is likely related to the rarity of these tumors. We suspect the frequency of these tumors to increase as we develop more efficient ways to diagnosis them and with this, we suspect there will likely be increased rates of their association with PNS.

Given their rapid progression in addition to frequent delay in their diagnosis, patients with PNS often have irreversible neurologic damage once their diagnosis is finally confirmed. Unfortunately, Anti-Hu positive PNS generally do not respond well to immunotherapy compared to other antibody associated PNS as the associated antigens are intracellular in location. Treatment is generally directed toward treating the underlying malignancy. In a study involving 63 patients followed for 1 year, the only therapy that demonstrated clinical stability or improvement involved treating the underlying malignancy. Thus, prompting the need for earlier tumor detection.

Unfortunately, the initial diagnosis of a PNS is often difficult and even overlooked when the presenting symptoms are non-specific and there is no evidence of underlying malignancy. [8] Diagnostic criteria and clinical situations where the evaluation for PNS should occur have been published in Graus et al. Our case met criteria for "definite" diagnosis for PNS given the presence of a classical syndrome and a well characterized onconeural antibody. As previously described and supported by this case presentation, it is not uncommon for a paraneoplastic syndrome to develop before a cancer is identified; therefore, as supported by Graus et al. and others when suspicion is high, investigations for tumor identification should be initiated. Specific paraneoplastic antibodies and clinical syndromes are often used to guide investigations of identifying the occult malignancy such as the use of mammogram, breast MRI, or ultrasound of the pelvis or testes, when clinically indicated. If otherwise unspecified, CT of the chest, abdomen, and pelvis may be utilized. Some studies have suggested the use of Whole-body FDG-PET combined with CT, with improved sensitivity and specificity for identifying an occult malignancy when compared to CT alone. Even in the setting of a negative evaluation, it has also been recommended to continually repeat cancer screening approximately every 3 to 6 months for up to 4 years.

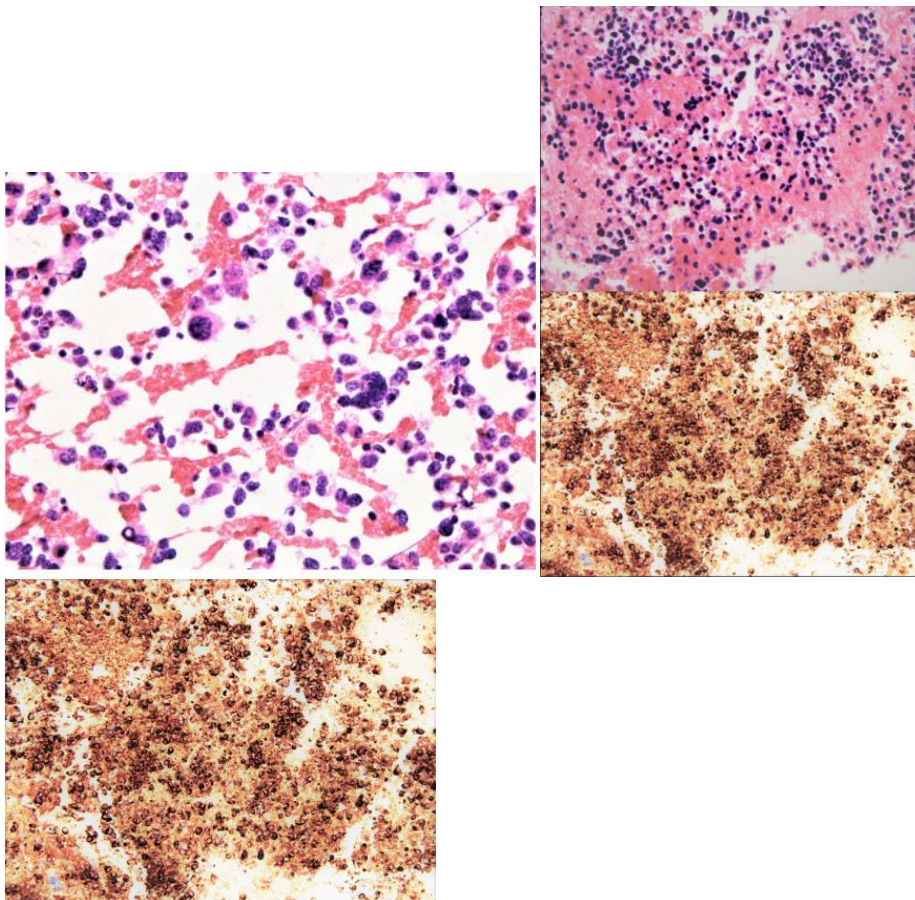
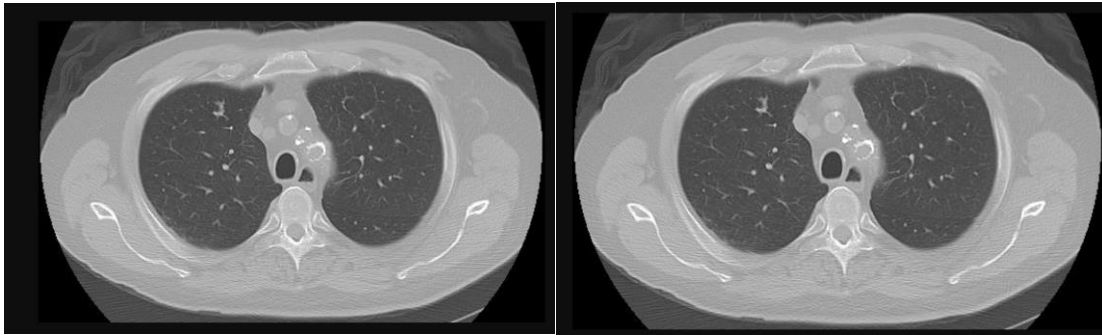
Identification of these syndromes is challenging and often overlooked, especially when the primary nodule is inconspicuous and the presenting symptoms highly variable. We present this case in an effort to increase awareness of this rare and likely underrecognized malignancy and knowledge of PNS as a potential presenting symptom. In addition, we hope to promote that PNS be considered in the differential for any patient presenting with unexplained neurologic symptoms.

#### **Learning Objectives**

- Paraneoplastic neurologic syndromes are remote effects of malignancy involving the nervous system not related to tumor invasion, compression, or metastasis
- It is not uncommon for a paraneoplastic neurologic syndrome to be the first clinical manifestation of malignancy, with as many as 80% of patients having no evidence of underlying tumor at initial presentation

- Paraneoplastic neurologic syndromes should be considered in the differential for any patient presenting with unexplained neurologic symptoms.

**Tables and/or Figures**



## Pericardial Diverticulum: A potential hidden diagnosis

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

Pericardial cysts are simple, serous fluid containing collections most frequently located near the right cardiophrenic angle. They are a rare entity constituting 7% of all mediastinal tumors occurring in 1/100,000 patients.<sup>2</sup> In 10% of pericardial cysts, a communication is present between the cyst and the pericardium called a pericardial diverticulum.<sup>1, 3</sup> Histologically, the cysts are lined with a single layer of mesothelial cells surrounded by collagen and elastic fibers and contain a water-like fluid. They vary in size from 2-3cm to rarely as large as 28cm.

The cysts are most often congenital, although can be acquired most often through cardiothoracic surgery. A pericardial diverticulum usually results from the gradual stretching of a portion of the inner serous layer of the parietal pericardium herniating through the weakened outer fibrous layer of pericardium.

Pericardial cysts are most commonly found incidentally on chest imaging; although, they can cause symptoms mainly through pressure of the cysts on adjacent organs. Echocardiogram with color doppler can help further differentiate and delineate the exact positioning.

Complications of pericardial cysts include rupture, erosion into adjacent structures, including the right ventricular wall and superior vena cava, cardiac tamponade, mitral valve prolapse, obstruction of right mainstem bronchus and atrial fibrillation.

Treatment for pericardial cysts and diverticulum is not well-defined but usually is conservative unless the patient is symptomatic since these lesions are benign and often located next to the phrenic nerve which can make surgical excision difficult.<sup>1, 3</sup>

#### Case Presentation:

A 44 year old female with a past medical history of type 1 diabetes, chronic kidney disease stage 3, hypertension, hyperlipidemia, hypothyroidism presented with shortness of breath at an outside facility where she was diagnosed with nephrotic syndrome with recurrent bilateral pleural effusions. She received 5 thoracentesis before being transferred for pleurodesis evaluation.

During the right-sided VATS, a pericardial cyst was noted to be protruding into the right hemithorax. The pericardial cyst was excised but then it was noted that a pericardial diverticulum was also present. A pericardial window was then performed followed by the planned pleurodesis. Pathology confirmed a benign mesothelial cyst but also reported focal chronic inflammation on the specimen; however, the patient has no known history of pericarditis, cardiothoracic surgery or rheumatologic disease.

While initially all of the patient's dyspnea was correlated with her bilateral pleural effusions, it is possible that part of her dyspnea was related in part to the pericardial diverticulum. Given her shortness of breath, multiple images of the chest were done prior including chest radiograph, transthoracic echo and chest CT but none revealed a pericardial cyst. This could be due to her large pleural effusions obscuring the imaging and the lack of IV contrast due to chronic kidney disease.

**Final Diagnosis and Outcome:**

Pericardial cysts are rare, benign, mostly congenital mesothelial cysts with pericardial diverticulum being even more rare. Patients are typically asymptomatic but can have vague symptoms including dyspnea and atypical chest pain making them difficult to distinguish when other heart and lung comorbidities are present. These other comorbidities can further complicate the diagnosis by obscuring imaging findings. In our case during VATS, a pericardial diverticulum was discovered incidentally. Development of the pericardial diverticulum could be either related to idiopathic pericarditis or congenital factors. While the best course of treatment is not well defined for these lesions, in our patient it was resected due for increased symptom management.

**Learning Objectives**

Describe common features, complications, outcomes and treatment for pericardial cysts and diverticulum

Diagnosis pericardial cysts and diverticulum

Identify obstacles to diagnosis of pericardial cysts and diverticulum

## Clinical Benefits of Continuous Glucose Monitoring in the Real-World Practice

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Background:** Diabetes mellitus (DM) is currently the 7th leading cause of death in the United States of America (US) and affects roughly 10% of the US population. Despite the advent of newer hypoglycemic medications, only 30% of patients with DM are meeting the A1C goal set forth by the American Diabetes Association. Continuous glucose monitoring (CGM) is a relatively new technology that provides patients with DM the insight needed to achieve and maintain glycemic control. This study assesses the clinical benefits of personal CGM.

**Methods:** In this retrospective study, our cohort contained 91 patients with type 1 and type 2 DM who were initiated on the personal CGM for management of their DM. User-blinded diagnostic CGM was used to assess the patient's average glucose and time spent in severe hypoglycemia (<54 mg/dl), hypoglycemia (<70 mg/dl), hyperglycemia (>180 mg/dl), and severe hyperglycemia (>250 mg/dl). These values were used as the patient's baseline and compared to values found after 3 months of personal CGM. In addition, hemoglobin A1c (HbA1C) data before and after the initiation of personal CGM was collected and compared.

**Results:** Among the 91 subjects (median age 61 years, BMI 29.1 kg/m<sup>2</sup>, and 56% female), 31 participants had more than 3 months of personal CGM data and user-blinded diagnostic CGM data prior to the personal CGM use. In addition, 87 subjects had HbA1c done before and 3-6 months after personal CGM application. Paired t-test showed significant reduction in HbA1c after personal CGM application (Mean HbA1c 8.11 vs 7.63; P = 0.002). Subgroup analysis of 31 patients with CGM data showed a 7.87% reduction in time spent in hypoglycemia (glucose < 70 mg/dl) and a 4.3% reduction in time spent in severe hypoglycemia (glucose < 54 mg/dl) with p < 0.001. There was not a significant change in average glucose or the amount of time spent in hyperglycemia.

**Discussion:** Among adults with both type I and type II DM, the use of personal CGM for > 3 months in a real-world clinical setting resulted in a significant reduction in HbA1c, decrease in hypoglycemia as well as severe hypoglycemia compared with pre-CGM initiation parameters. These results suggest the potential for personal CGM to further increase the percentage of patients able to reach their A1c goal as well as decrease health care expenditure associated with hypoglycemic episodes. Further research should be done to assess longer term effectiveness, as well as a detailed cost benefit analysis to assess the potential for insurance expansion of coverage for personal CGM.

### Learning Objectives

Upon completion of this lecture, learners should be better prepared to 1) Discuss the clinical benefits of CGM for patients with diabetes mellitus

## Rectal Bleeding Risk Factors in Patients Treated with External Beam Radiation of the Prostate

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Background/Knowledge Gap:

Radiation proctitis can occur when the rectum receives large doses of radiation therapy. Newer technologies allow for reduced incidence of these toxicities. Predictors of additional toxicity in this population are not well studied. In this retrospective review, we sought to describe and analyze the presenting clinical features in our cohort and evaluate possible predictors of severity and chronicity in men with radiation proctitis after treatment with IMRT for prostate cancer.

#### Materials/ Design:

A retrospective cohort study of 383 patients treated with IMRT for prostate cancer between 1/1/2009-11/31/2019 was conducted. Descriptive and multivariate regression analyses were conducted.

#### Results/Findings:

383 patients were included in our study with a median follow up of 17.6 months. The rate of gastrointestinal comorbidities in all patients including diverticulosis, diverticulitis, hemorrhoids, colon cancer, ulcerative colitis, IBD, was 18.8% (72 patients). Seven percent (27 patients) had anticoagulant therapy and 36% (139 patients) had aspirin therapy during or after radiation therapy. Median follow up after completion of radiation therapy was 17.6 months (range 0.0 – 124.4 months). The overall rate of gastrointestinal bleed was 18.5 % (72 patients). The overall rate of rectal bleed due to radiation proctitis was 4.4% (17 patients). Median months to first episode of rectal bleed after completion of RT was 13.4 months. The rate of patients with Grade 3 radiation proctitis, bleeding/nonbleeding, was 7.5% (29 patients). On multivariate analysis, only presence of gastrointestinal comorbidity was considered statistically significant ( $p < 0.01$ ).

#### Conclusions/Implications:

In this series, IMRT to the prostate was well tolerated with low rates of Grade 3 radiation proctitis. Time to first episode of rectal bleed was 13.4 months. The presence of additional gastrointestinal comorbidity in this cohort may increase the risk of radiation proctitis. Prospective evaluation and long term follow up to determine how to mitigate rates of radiation proctitis is warranted to improve symptom burden and quality of life outcomes in patients receiving radiation therapy for prostate cancer.

### Learning Objectives

- Evaluate potential predictors of radiation proctitis in patients undergoing external beam radiation.
- Measure the risks of radiation proctitis associated with gastrointestinal comorbidities and use of antiplatelet/anticoagulation therapies in patients undergoing external beam radiation.
- Diagnose radiation proctitis early in those patients with significant gastrointestinal comorbidities.

## A CASE OF ENTRAPMENT! COMPLICATION OF MESOTHELIOMA.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

We are presenting a case of Lung entrapment, a potential complication of malignant mesothelioma. A study published in the American thoracic society journal reported, out of 229 patients diagnosed with mesothelioma, 192 were found to have pleural effusion at presentation. It also reported that 64 out of the 192 (33.3%) patients developed Lung entrapment.

#### Case:

A 75-year-old male with a past medical history of diabetes mellitus type 2, hypertension, and stage 3 mesothelioma, currently on maintenance therapy with Pemetrexed and radiation. He presented to the ED with worsening dyspnea from baseline, generalized weakness, fatigue, and multiple falls. He was tachypneic on admission and pertinent labs included a hemoglobin of 6.7 g/dL and severe leukocytosis. Chest x-ray showed increased pulmonary vascular congestion, a loculated right sided pleural effusion and density in the left lung base, possibly due to atelectasis vs infiltrate. CT chest without contrast was significant for bilateral pleural effusions. The initial working diagnosis included congestive heart failure versus pneumonia, with a possible empyema.

#### Management:

Patient was started on IV diuretics and broad spectrum antibiotics. In addition, an upper extremity venous doppler study revealed a deep venous thrombosis in the right internal jugular vein, therefore, treatment with therapeutic enoxaparin was initiated. A transesophageal echocardiography showed an ejection fraction of 55-60% along with grade 1 diastolic dysfunction. During this time, serum creatinine worsened to 3.4 (1.9 on admission), subsequently diuretics were discontinued. The acute kidney injury was due to a combination of pre-renal and post-renal (BPH) etiologies, and the patient was managed with IV fluids and insertion of a foley catheter. Infectious Disease recommended discontinuing antibiotics due to no clear source of infection. Patient underwent bilateral thoracentesis which yielded more than 2L of exudative yellow colored fluid, negative for malignant cells. Repeat chest x-ray showed incomplete expansion of the right lung, compatible with "Lung Entrapment". Cardiothoracic surgery recommended that the patient was not a candidate for decortication and a right sided tunneled pleural catheter was placed.

#### Final diagnosis:

Exudative pleural effusion due to malignant mesothelioma complicated by right sided lung entrapment.



**Discussion:**

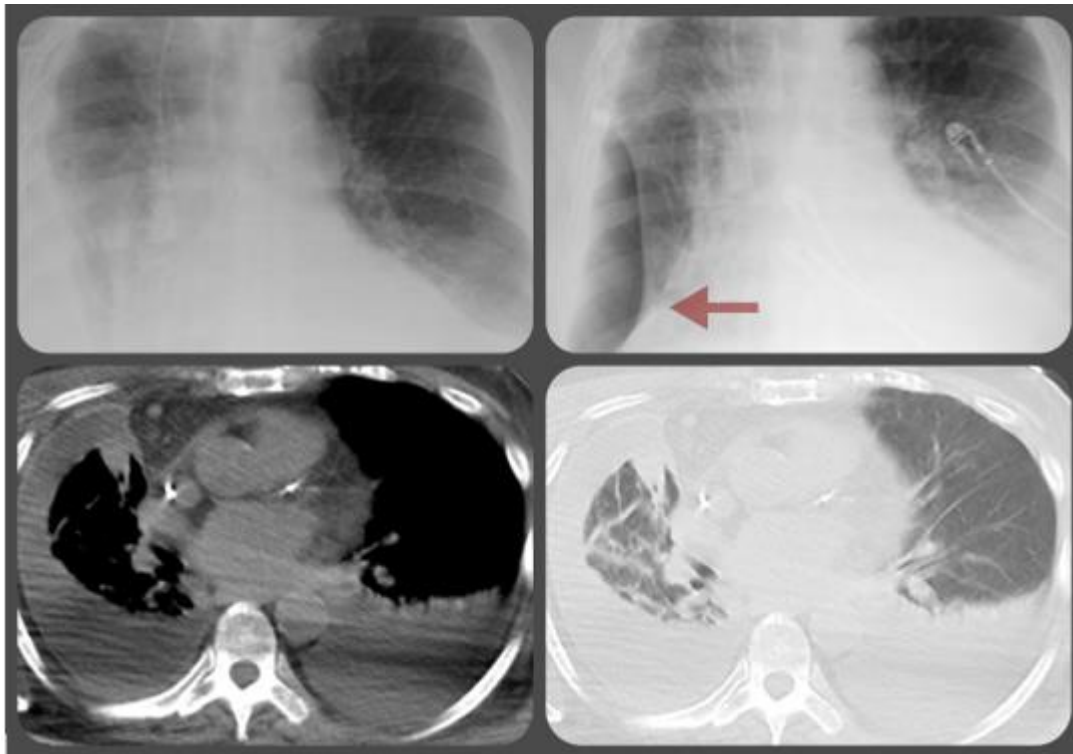
An unexpandable lung can be due to either lung entrapment or a trapped lung. Lung entrapment is usually due to an inflammatory process that hinders the lung and/or the pleura from fully expanding, revealing an exudative effusion by light's criteria. The common causes include pleural malignancies, empyema, and autoimmune pathologies including rheumatoid pleurisy, etc. Trapped lung is a result of a fibrotic process affecting the visceral pleura preventing the lung expansion and a net-negative pressure in the pleural space leading to effusion formation. Trapped lung is usually a consequence of lung entrapment with incomplete resolution of the inflammatory trigger.

Malignant pleural mesothelioma may result in tumor development on the visceral pleural surface, provoking an inflammatory process leading to lung entrapment. Mainstay in management is to address the underlying pathology. Entrapment due to malignancies are not usually responsive to chemotherapy and patients with symptomatic improvement with pleural fluid removal are managed by placement of an indwelling pleural catheter. Pleuroperitoneal shunts may be an option if a chronic transcutaneous drain is not preferred. Pleurectomy or decortications can be performed, which were not viable options in our patient. Despite receiving chemotherapy and radiation therapy for his malignancy, our patient developed lung entrapment, making this a unique finding.

**Learning Objectives**

- Discuss the pathophysiology of lung entrapment and trapped lung.
- Discuss the pathology of lung entrapment in the context of malignant mesothelioma.
- Discuss the management options of lung entrapment.

**Tables and/or Figures**



## Obesity a Risk Factor for Severe COVID-19 Morbidity in Pediatric Population: A Case Series

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Introduction:

With the emergence of COVID-19 pandemic, many studies have been published to determine the spectrum of illness, risk factors, prevention, and treatment strategies. Due to relatively fewer pediatric cases as compared to adults, there is a paucity of clinical data available to fully understand the risk factors and disease course in the pediatric population. Our understanding is evolving with limited data showing an increased risk of severe or critical disease in children aged <1 year and those with underlying conditions, such as chronic lung disease (including asthma), cardiovascular disease, and immunosuppression according to the CDC. Recognition of emerging risk factors for morbidity and mortality is now paramount, in order to anticipate and provide appropriate clinical care specific to the pediatric population. To date, obesity has been suggested but not well described as a risk factor for severe COVID-19 disease in children.

#### Case presentation:

This case series outlines two adolescent female patients requiring pediatric ICU level care, who presented with severe acute respiratory syndrome from COVID-19 with similar initial presentations and the shared risk factor of obesity.

Case 1: A 16-year-old female with BMI 47.7kg/m<sup>2</sup> presented with 5 days of fever, vomiting, diarrhea, cough, and shortness of breath (SOB) that developed after she attended a graduation party. On examination, she was alert but in moderate distress with shallow breaths, clear lung field, mild abdominal tenderness, and oxygen desaturations to 80% with activity. She was also found to have cracked lips and purple discoloration of her toes. She tested positive for COVID-19 with evidence of infiltrates and bilateral pneumonia on chest X-ray. Initially, she was placed on 3L oxygen support via nasal cannula. Over a period of 24 hours, she developed progressively worsening hypoxia and respiratory distress, requiring escalation of oxygen support to Vapotherm 40L with 100% FiO<sub>2</sub> and transfer to the PICU. Due to her continued respiratory deterioration, support was escalated to BIPAP for the next 24 hours. She was then intubated due to persistent hypoxia and started on ventilatory support with the addition of nitric oxide. She was extubated after 9 days and gradually improved. During her hospitalization, she also had elevated ESR/CRP, elevated transaminases, hypoalbuminemia, thrombocytopenia, leukopenia, and elevated fibrinogen, D-dimer, creatinine kinase and lactate dehydrogenase concerning for multi-system inflammatory syndrome (MIS-C). She was treated with remdesivir, convalescent COVID-19 antibody serum, dexamethasone, IVIG, and prophylactic lovenox for anticoagulation. She was discharged after a total of 21 days of hospitalization.

Case 2: A 15-year-old female with BMI 43.7 kg/m<sup>2</sup>, poorly controlled asthma and untreated hypothyroidism presented with 5 days of fever, congestion, cough, SOB, and headache. On examination, she was alert with minimal acute distress, had decreased breath sounds in lower lobes and crackles over the posterior lung fields (postural), with oxygen desaturations to 80% with activity. She tested positive for COVID-19 without any

evidence of airspace disease on CXR. Initially she was placed on 2L oxygen support via nasal cannula, however, she rapidly deteriorated over a course of 8 hours with increasing oxygen requirements and was transitioned to Vapotherm 16L with 50% FiO<sub>2</sub>. She was transferred to the PICU. She received albuterol, dexamethasone, and prophylactic lovenox for anticoagulation. Due to persistent hypoxia, her respiratory support was increased to Vapotherm 35L with 70% FiO<sub>2</sub> over the course of 48 hours with clinical improvement in hypoxia and respiratory status. Her support was weaned to room air over the next 48 hours, and then she was observed for 24 hours off of any supplemental oxygen before discharging home. Fortunately, this patient responded well to high flow oxygen alone and did not require ventilatory support. Her total length of hospitalization was 7 days. This patient was also assessed for the possibility of concurrent MIS-C but her lab work up, historical or clinical manifestation ruled out the diagnosis.

### Learning Objectives

1. Given the limited availability of data about the spectrum of the COVID-19 in pediatric population, it is paramount to promptly identify the risk factors which puts patients at higher risk for development of severe disease.
2. Early recognition of the high risk factors will help healthcare providers to anticipate the level of care needed by a patient and will benefit the healthcare system at large with early and proper isolation of the patient, judicious use of resources and personal protection measures taken by healthcare workers
3. Emphasis on early recognition and general awareness of clinical and laboratory features of MIS-C development in pediatric patients infected with COVID-19.

Upon completion of this lecture learners should be better prepared to identify at high risk pediatric patients based on their history and presentation of patients positive for COVID-19. They should be able to be aware of the needs of these patients in advance so that quick and adequate measures can be taken to help escalate care. They should also be prepared for protecting themselves and other healthcare workers from this life-threatening viral illness.

## Assessing the burden of COVID-19 on the mental health of internal medicine residents.

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### Background:

COVID-19 pandemic brings up unprecedented changes in the way health-care workers (HCW) deliver care. Highly challenging environmental conditions are being faced by HCW and it has been associated with an elevated risk of undergoing mental health symptoms, especially for resident physicians who are still in training. This survey aims to assess the impact of COVID 19 pandemic on the mental health of internal medicine (IM) residents.

#### Methods:

We have conducted an anonymous survey consisting of eight single-answer multiple-choice questions, along with validated GAD-7 and PHQ-9 questionnaires to assess the prevalence and severity of anxiety and depression among IM residents during COVID-19 pandemic. The survey was electronically sent to eight IM residency programs in New Jersey, Massachusetts, and Florida on 04/12/2019. The last response was gathered on 05/20/20. The primary outcome was the prevalence of anxiety and depression among the residents. Information on PGY and rotation, living situation, gender, religion, pre-existing mental disorder, and total number of COVID-19 or patient under investigation (PUI) were also collected in the survey. Student T-test and ANOVA tests were used to compare continuous variables.

#### Results:

40 valid responses were collected and analyzed in the study. 52% of the residents were female. 7 participants screened positive for anxiety and 7 for depression, with a GAD-7 cutoff  $\geq 10$  and PHQ-9  $\geq 10$ , respectively. Residents in elective rotations without exposure to COVID-19 symptomatic patients were not associated with lower GAD-7 or PHQ-9 scores (GAD-7  $2.9 \pm 0.7$ ,  $p=0.4$ , and PHQ-9  $2.1 \pm 1.2$ ,  $p=0.5$ ). Risk factors associated with higher levels of anxiety and depression are female gender (GAD-7  $8.7 \pm 1.4$  vs  $3.2 \pm 0.6$ ,  $p=0.001$  and PHQ-9  $7 \pm 1.3$  vs  $2.6 \pm 0.7$ ,  $p=0.008$ ), living alone/pets (GAD-7  $8.2 \pm 1.7$  vs  $4.6 \pm 0.8$ ,  $p=0.04$  and PHQ-9  $7.2 \pm 1.6$  vs  $3.4 \pm 0.8$ ,  $p=0.02$ ) and being a PGY-3 (GAD-7  $9.2 \pm 1.9$  vs  $5.6 \pm 1.4$  for PGY1 vs  $3.3 \pm 0.7$  for PGY2,  $p=0.2$  and PHQ-9  $8.5 \pm 1.9$  vs  $4 \pm 1.1$  for PGY1 vs  $2.2 \pm 0.5$  for PGY2,  $p<0.01$ ). History of mental health disorder (GAD-7  $10.7 \pm 5.2$ ,  $p=0.14$  and PHQ-9  $10.0 \pm 5.3$ ,  $p=0.08$ ) and total COVID-19 and PUI patient encounter  $> 5$  (GAD-7  $7.4 \pm 1.3$ ,  $p=0.09$  and PHQ-9  $6.3 \pm 1.2$ ,  $p=0.13$ ) showed a non-statistically significant trend to increased anxiety and depression. Perception of insufficient personal protective equipment (PPE) does not affect the GAD-7 or PHQ-9 scores (GAD-7  $5.8 \pm 1.4$ ,  $p=0.73$ , and PHQ-9  $4.9 \pm 1.3$ ,  $p=0.95$ ).

#### Conclusions:

Female gender, living alone or with pets, and being a PGY-3 during COVID-19 pandemic are associated with a significant risk of new-onset anxiety and depression among IM residents. Perception of sufficient PPE does not affect the GAD-7 or PHQ-9 scores. Early identification of high-risk residents and early psychological interventions will likely mitigate the burden of COVID-19 on the mental health of doctors in training.

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**Learning Objectives**

1. Discuss the impact of COVID 19 pandemic on the mental health of internal medicine (IM) residents.
2. Identify the main risk factors associated with a significant risk of new-onset anxiety and depression among IM residents during COVID 19 pandemic.
3. Examine the foundations on how to identify high-risk residents for new-onset anxiety and depression during COVID 19 pandemic and appropriately refer them to early psychological interventions

**Tables and/or Figures**

Total N=40		N (%)	GAD7 Score(Mean ± SE)	p-value	PhQ9 Score(Mean ± SE)	p-value
PGY	PGY-1	14(35%)	5.6± 1.4	0.0212	4±1.1	0.0048
	PGY-2	13(33%)	3.3± 0.7		2.2±0.5	
	PGY-3	13(33%)	9.2±1.9		8.5±1.9	
Rotation	Elective	7	2.9±0.7	0.4027	2.1±1.2	0.505
	ICU	13	6.5±1.5		5.1±1.7	
	NF	8	7.6±2.4		5.9±2.5	
	Ward	12	6.4±1.8		5.7±1.2	
Gender	Female	21	8.7±1.4	0.001144	7 ±1.3	0.008333
	Male	19	3.2±0.6		2.6 ±0.7	
Religion	Yes	17	7.4±1.7	0.211654	6.1 ±1.7	0.240236
	No	23	5.1 ±0.9		4.0 ±0.8	
Living situation	Alone/pets	16	8.2±1.7	0.0481	7.2 ±1.6	0.0241
	Family/friends	24	4.6±0.8		3.4 ±0.8	
Previous existing mental health conditions	Yes	3	10.7 ±5.2	0.141102	10.0±5.3	0.083588
	No	37	5.7 ±0.9		4.5±0.8	
Perception of sufficient PPE	Sufficient	21	5.8 ±1.4	0.738017	4.9 ±1.3	0.958029
	Not sufficient	19	6.4±1.1		4.9 ±1.0	
COVID19 pt encounter in the past two weeks	0	20	4.6± 1.1	0.2288	4.1± 1.2	0.42
	1--4	6	6.8 ±3		4± 1.8	
	>5	14	7.9 ±1.6		6.4± 1.4	
Total COVID and PUI pt encounter	0	8	2.4 ±0.7	0.0997	1.8 ±1.1	0.1331
	1--4	14	6.4± 1.8		4.9± 1.6	
	>5	18	7.4 ±1.3		6.3± 1.2	

## Pomalidomide Associated Pulmonary Toxicity: A Rare, Ravaging Reaction

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

**Introduction:** Pomalidomide is an immunomodulatory imide drug (IMiD) used in the treatment of refractory multiple myeloma (MM). First approved for this indication by the FDA in 2013, when used alongside low-dose dexamethasone, for MM patients who have failed two previous therapies including lenalidomide and a protease inhibitor while exhibiting progression of their disease (1,2). This drug is a cell growth inhibitor and directly inhibits both myeloma cell expansion and angiogenesis (3). Given its powerful activity there is interest to investigate its potential effects on other cancers and it was approved for treatment of Kaposi sarcoma in May 2020 (4). The most common side effects of pomalidomide include fatigue, pancytopenia, peripheral edema, peripheral neuropathy, and gastrointestinal intolerance (5). However, less commonly but more seriously, pomalidomide has been associated with pulmonary toxicity. This case is only the seventh to ever be reported, per extensive literature review, and follows a similar pattern of restrictive lung disease and pulmonary fibrosis (6).

**Case Report:** A 73 year old African American male with a history of MM, stage 3a chronic kidney disease, chronic obstructive pulmonary disease, systolic heart failure, paroxysmal atrial fibrillation on warfarin, sick sinus syndrome status-post pacemaker, tobacco use disorder (20 pack-year history - stopped smoking 14 years ago), and peripheral vascular disease presented to the hospital with complaints of malaise for the past few days as well as dyspnea and a cough productive of yellow sputum. On exam the patient was elderly-appearing, cachectic with temporal wasting, a scaphoid abdomen, coarse breath sounds bilaterally, and 3+ pitting edema to bilateral lower legs. He was hypotensive, septic, and had a chest x-ray showing a small right pleural effusion and stable lung markings compared to a chest x-ray from the month prior. The patient was admitted to the intensive care unit, administered supplemental oxygen via high flow nasal cannula, and given appropriate antibiotics for what was later confirmed to be pseudomonas pneumonia. Upon more thorough review of the patient's chart, a chest CT from the prior month was found that showed substantial new fibrotic lung disease not seen on CT imaging from 4 months prior (figure 1). Interestingly, outpatient pulmonary function testing had also been completed around the same time as the abnormal chest CT the month prior which showed new restrictive lung disease: a very low diffusing capacity for carbon monoxide (DLCO) at 22% of predicted that did not correct and a reduced total lung capacity (TLC) of 62% (figure 2). Discussion with the patient's primary oncologist revealed that he had been on pomalidomide intermittently for approximately the last six years, the most recent cycle of which started 4 months ago – the same time as the stable chest CT without fibrosis. The patient's pomalidomide was stopped and high-dose prednisone was administered with mild clinical improvement, exhibited by gradually decreasing oxygen requirements in the following days. Unfortunately, after a prolonged hospital course the patient became increasingly encephalopathic and his family elected to pursue comfort care per the patient's wishes.

**Final diagnosis:** Pomalidomide associated restrictive lung disease with pulmonary fibrosis

**Discussion:** This patient's well-documented timeline of developing restrictive lung disease after starting a cycle of pomalidomide argues for the potential pulmonary toxicity of the drug even after years of previously uneventful use (figure 3). The pattern of restrictive disease with marked pulmonary fibrosis is a typical lung injury pattern with the other few reported cases (6). No other potential causes for the new-onset restrictive lung disease could be identified including a thorough medication review and interview regarding environmental exposures. There was marginal improvement in respiratory status upon drug cessation and administration of corticosteroids further supporting pomalidomide as the

offending agent. Sadly, this patient did not survive long enough to observe for potential reversal of lung injury. These findings suggest continued caution with the use of pomalidomide even in previously safe chronic use and the need to consider alternative treatment therapies if the development of new-onset of restrictive lung disease or pulmonary fibrosis are seen.

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### Learning Objectives

- Discuss possible side effects of immunomodulatory imide drugs used in the treatment of multiple myeloma
- Interpret pulmonary function testing
- Implement a new strategy for patients receiving pomalidomide who develop worsening pulmonary function

### Tables and/or Figures

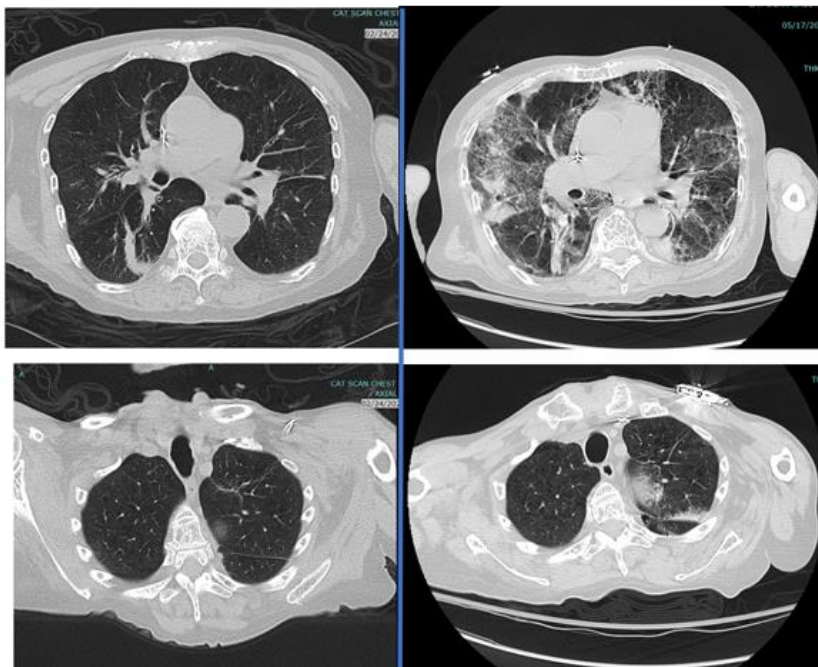


Figure 1. Side-by-side comparison of chest CT from 2/24/20 (left) and 5/17/20 (right). Mid-chest images on top. More apical views on bottom.

## Anomalous Left Coronary Artery from the Pulmonary Artery Presenting in an Adult with Heart Failure

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Medicine & Medical Subspecialties

### Abstract

#### INTRODUCTION

Anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) syndrome is a rare congenital anomaly, occurring in 1 in 300,000 live births. This condition will commonly lead to ischemia and heart failure and without intervention, results in a 90% mortality rate within the first year of life [1]. Survival beyond this time period is dependent on collateral circulation from the right coronary artery. Adult presentation is therefore rare with most patients presenting with left ventricular systolic dysfunction. [1,2]. Additionally, an 80 to 90% incidence of sudden cardiac death in patients with a mean age of 35 years has been reported [3].

#### CASE SUMMARY

A 45-year-old male presented to the emergency room with two weeks of worsening exertional dyspnea and edema with erythema of his lower extremities. He was admitted for suspected heart failure. He had TTE which showed reduced LVEF 40%. Patient underwent coronary angiography that demonstrated a markedly dilated right coronary artery with contrast enhancement of the left coronary system that arose from the pulmonary artery as seen in Figure 1. There was no atherosclerotic CAD. A CT coronary angiography demonstrated significant collateral circulation from the posterior descending artery to the left anterior descending artery and obtuse branches of the circumflex artery. The left main coronary artery originated in the posterolateral segment of the pulmonary artery. A diagnosis of ALCAPA was made.

Patient underwent coronary artery bypass surgery SVG to LAD and pulmonary artery was opened and the anomalous left main coronary ostium was patched Figure 2. Medical therapy for ischemic cardiomyopathy was initiated. At 6 month follow up patient has remained asymptomatic and LVEF improved to 60 %.

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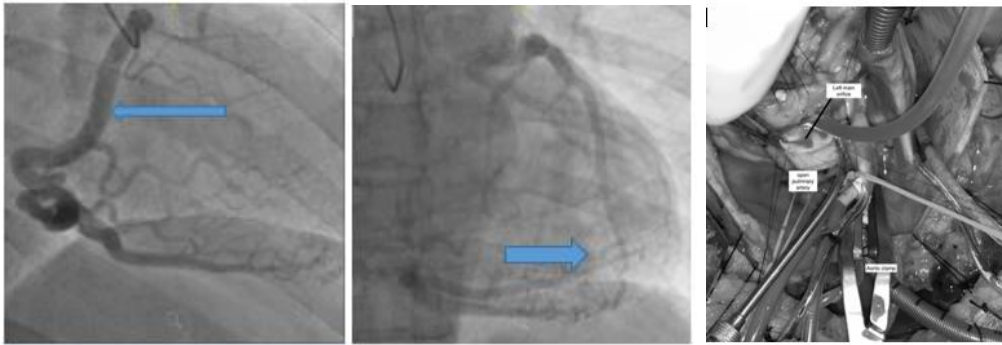
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#### Learning Objectives

1. ALCAPA syndrome albeit sporadic is not confined only to childhood and should be considered in adults as well
2. Prognosis at time of presentation of ALCAPA depends on development of adequate collateral circulation
3. All anomalously arising coronary arteries from the pulmonary artery require surgical correction



Tables and/or Figures



## Beyond The Barriers: A Case Series On Advanced Stage Breast and Gynecologic Cancer In New Orleans

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Background/Knowledge Gap:

Breast and gynecologic cancer screenings are available to a wide population of female patients through insurance providers and various support programs, however these cancers remain prevalent in our population today. In the context of screening availability, barriers leading to late/end-stage breast and gynecologic cancers must be explored. This report aims to highlight unique barriers that contribute to presentation with late-stage breast and gynecologic cancer in women of low socioeconomic status.

#### Methods/Design:

Overall, six patients were reviewed who developed late/end-stage breast and gynecologic cancers. Female OB-GYN patients of low socioeconomic status were chosen with a diagnosis of early-stage breast or gynecologic cancer from 2015 to 2019 who were lost to care. A retrospective review of medical records was performed, and barriers were identified that impeded the completion of their treatment course.

#### Results/Findings:

In this review, it was found that this sample of patients faced several comorbidities, such as positive HIV status, substance abuse disorder, heart disease, in addition to socio-economic factors such as incarceration, gun-violence, medication noncompliance and inadequate insurance. In each individual scenario, the patient encountered a unique barrier that prevented recommended follow-up. These barriers were found to have impeded treatment course leading to progression of malignancy.

#### Conclusions/Implications:

As a result of this review, it was found that while these women had an early-stage diagnosis, they faced concomitant medical and/or social barriers to continue regular follow-up with their OB-GYN. These extraneous barriers were not adequately addressed leading to the progression of their disease process. As healthcare providers, it is imperative to develop a system equipped to address multifaceted aspects of patient care to reduce barriers to healthcare access, therefore preventing disease progression.

### Learning Objectives

1. Identify concomitant medical disease and social barriers that can impede follow-up for women of low socioeconomic status
2. Demonstrate the effect of delayed care on health outcomes for breast and gynecological cancers.
3. Implement new strategies to ensure better compliance to follow-up care.

## Understanding Attitudes Toward Contraception and Barriers to LARC Use in the Teenage Population

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<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Background:** Long-acting reversible contraceptives (LARC), such as intrauterine devices (IUDs) and subdermal implants, are recommended as the first-line contraceptive for all women, including adolescents. Despite their high efficacy and safety, LARC use among sexually active teenagers remains under 6% nationally. Our study aimed to identify barriers to LARC use in adolescent patients at an urban pediatrics clinic in Eastern Virginia.

**Methods:** Female patients ages 13-19, parents, and providers were asked to complete self-administered surveys. Surveys included demographic questions and questions regarding beliefs and attitudes towards three contraceptive methods: oral contraceptive pills (OCPs), IUDs, and implants.

**Results:** A total of 144 surveys were completed by patients (n=53), parents (n=40), and providers (n=51). Among the adolescents surveyed, 15 (28%) reported being sexually active and 22 (42%) reported ever having used a contraceptive. Adolescents reported using implants (26%), condoms (9%), and OCPs (3%) as contraceptive methods. Few adolescents had general knowledge about IUDs, with 14% rating the statement "I know basic information about IUDs" to be somewhat or extremely true compared to 36% for implants and 49% for OCPs. Adolescents' choice to use a contraceptive method was significantly correlated with perceived parental support ( $r > 0.6$ ) and beliefs in the method's side effects ( $r > 0.5$ ). Parents were most likely to recommend OCPs (38%) to their child, followed by IUDs (23%) and implants (15%). Providers were most likely to recommend OCPs (76%), followed by implants (64%) and IUDs (44%).

**Conclusions:** Contraceptive preference and knowledge level varied between teen patients, parents, and providers. Although subdermal implants were the most used contraceptives among adolescents in our study, parents and health care providers surveyed recommended OCPs over LARC options. In addition, most adolescents did not know basic information about all three contraceptive methods, suggesting a need for enhanced education and provider communication regarding contraception and sexual health.

### Learning Objectives

- Describe current beliefs and attitudes towards long-acting reversible contraceptives in patients, parents, and providers at an urban pediatrics clinic in Eastern Virginia.
- Identify methods to address barriers and increase LARC use in adolescents in this community.

## A Rare Case of Familial Hypercholanemia

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction

Sodium taurocholate cotransporting polypeptide (NTCP) is a carrier protein that is encoded by the gene SLC10A1. This protein is expressed in hepatocytes and functions to uptake bile acids from the plasma. Bile acids contribute to many metabolic and hormonal pathways. In the liver, bile acids are synthesized from cholesterol. The NTCP protein is exclusively expressed in the liver and plays an important role in the transport of conjugated bile acids from the portal blood into the liver. This report describes an African-American infant patient with NTCP deficiency, who presented with poor weight gain and jaundice.

#### Case Presentation

The patient is a 6 week old African American Infant who was referred to the emergency department for further evaluation of poor weight gain and jaundice. Initial lab studies revealed elevated liver enzymes and direct hyperbilirubinemia. The hospital stay was complicated by recurrent bouts of hypoglycemia. Right upper quadrant ultrasound, MRCP, and fluoroscopic guided cholangiogram with liver biopsy were unrevealing. The infant continued to gain weight through her hospital stay and her liver enzymes trended down. She was discharged while liver biopsy results were pending.

#### Final Working Diagnosis

The pathology report from her liver biopsy showed “diffuse cellular and canalicular cholestasis, some ballooning of hepatocytes and focal giant cell transformation, small interlobular bile ducts, and extramedullary hematopoiesis.” A cholestasis panel was sent to Emory University. Her panel results revealed heterozygosity for familial hypercholanemia — a very rare genetic disorder characterized by elevated serum bile acids, pruritus, and fat malabsorption.

#### Management/Outcome/Follow Up

Management of NTCP deficiency is primarily supportive due to the relatively mild clinical course, including physical therapy and dietary management. Patients are particularly at risk for growth delay and fat soluble vitamin deficiency. Clinical management should include regular monitoring of liver enzymes.

#### Learning Objectives

1. Understand physiology of unusual genetic causes of elevated bilirubin in infants
2. Identify presentation and diagnostic workup of causes of elevated bilirubin in infants

## Determining Trends and Factors associated with Self-Reported Physical Activity among Adolescents in Rural North Carolina

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

**Background:** Insufficient physical activity (PA) in the youth can lead to adverse health outcomes, and youth in rural areas have particularly low PA. However, factors contributing to these levels remain unclear. Using data from a middle school-based wellness intervention called Motivating Adolescents with Technology to Choose Health™ (MATCH), we evaluated demographic and environmental factors predicting PA in adolescents across rural North Carolina.

**Methods:** We used cross sectional data from MATCH participants in 40 schools from fall 2018. Self-reported PA was determined from a validated question: “How many days each week are you active for at least 60 minutes?,” with results dichotomized into those achieving 1, 5 and 7 day(s) meeting the threshold. Other variables included sex, race, weight category determined from Body Mass Index percentile, and PACER score (measuring cardiovascular fitness). Three environmental variables, from a previous study, were scored for each school from 1-5 (higher = better environment) (Table 1). Analyses included appropriate measures of descriptive statistics (mean, t test, Chi Square), correlation (Pearson, Spearman), and regression models.

**Results:** Participants included 3,799 7th graders, approximately half male, half white, mean age of 12.7 years, and 27.8% obese. Male sex ( $p = <.0001$ ), white ( $p = <.0001$ ), and healthy weight ( $p = <.0001$ ) participants reported more days PA (Table 2). Associations between the environmental variables and self-reported PA yielded statistically significant but extremely weak ( $|r| \leq 0.1$ ) relationships; however, school PE and PACER ( $r = .27$ ,  $p <.0001$ ) were correlated. Regression models showed significant independent relationships of self-reported PA and school PE ( $B = .108$ ,  $p = .0011$ ) and race ( $B = -.306$ ,  $p = .0005$ ).

**Conclusion:** Adolescents in rural NC report low PA, but more is reported by male, white and healthy weight participants. School PE may increase student PA. Studies are warranted evaluating PA differences by race and sex.

### Learning Objectives

1. Evaluate factors that may impact physical activity levels in adolescents.
2. Discuss school and community level determinants that may impact physical activity levels in adolescents.

**Table 1.** Environmental Determinants for PA

County and School Level Determinants				
Determinant	Description	Level	Scale	Source
Exercise Opportunities	Adequate access to locations for physical activity	County	1-5	County Health Rankings & Roadmaps
Physical Education (PE)	How health/PE is provided for 7th grade students	School	1-5	School Survey
Physical Activity (PA)	PA exercises available outside of regular PE time	School	1,3,5	School Survey

**Table 2.** Unpaired t-test<sup>1</sup> and ANOVA<sup>2</sup> analysis between Sex, Ethnicity, and Weight Category with Self-Reported days per week (0-7) of 60 min. of PA

Self-reported days of 60 min PA at Baseline			
		Mean (SD)	p-value
<b>Sex</b>	Female	3.5 (2.2)	<.0001 <sup>1</sup>
	Male	4.0 (2.2)	
<b>Ethnicity</b>	Black	3.6 (2.3)	<.0001 <sup>2</sup>
	White	4.0 (2.2)	
	Other	3.4 (2.1)	
<b>Weight Category</b>	Under Weight	3.5 (2.2)	<.0001 <sup>2</sup>
	Healthy Weight	4.0 (2.2)	
	Overweight	3.6 (2.2)	
	Obese	3.4 (2.1)	

## Maternal Kratom use: A novel cause of Neonatal Abstinence Syndrome - A case series and literature review

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Women's & Children's Health

### Abstract

#### Introduction:

Maternal opioid use is a well-known cause of neonatal abstinence syndrome (NAS). However, for treating opioid dependence several women have been identified to sought after non-opioid alternatives, especially during pregnancy, to avoid withdrawal symptoms in their newborns. Kratom is a psychoactive herbal supplement with opioid activity and is marketed as a non-opioid remedy for opioid withdrawal. The active compounds are mitragynine and 7-hydroxymitragynine, which are selective and full agonists, respectively, at mu- opioid receptors. Although it is undetectable by standard drug screens, neonates have been found to be withdrawing and developing NAS when mothers' history are positive for Kratom use.

#### Case presentation:

We present two NAS cases secondary to maternal Kratom use. Both the neonates were term and developed withdrawal signs and symptoms within the first 36 hours of life and had elevated NAS scores. Subsequently, they were successfully treated with methadone. Therefore, awareness of the effects of maternal use of Kratom, which is a novel substance, is essential for better care for neonates, by both the healthcare providers and mothers.

Case 1: A 38-week male born vaginally to a 29-year-old G6 P4 A2 mother was transferred to our facility from a sister institute, where the patient was born, with the suspicion of NAS in the newborn. The patient was tremulous and was suspected to have seizures. On examination, the newborn had hypertonia, tremulousness and inconsolable crying. Mother had a significant history of marijuana, methamphetamines, suboxin (combination buprenorphine and naloxone) and tobacco use for 10 years but underwent rehabilitation and methadone wean one year before the pregnancy. However, it was found out that mom was on Kratom for the pain of contractions over the last two weeks before delivery. Due to suspicious seizure like activity, the patient was loaded with phenobarbital and a MRI of the brain and EEG were performed and reported as normal. Since his NAS scores were persistently above 12 within 28 hours of delivery, he was started on methadone. His urine and meconium drug screens (MDS) were positive for marijuana only. Methadone was weaned over a course of 17 days. NAS scores remained less than 10 for 48 hours prior to discharge home.

Case 2: A 40-week and 4 day male born vaginally to a 34-year-old G6 P2 A4 mother was transferred from the newborn nursery at 36 hours of age secondary to tachypnea and elevated NAS scores. On initial exam, he did not show any significant features of withdrawal, however over the next 24 hours he developed hypertonia with a high pitched cry and jitteriness. He was given morphine initially but his NAS scores persistently remained elevated, therefore, he was started on methadone and taken off of breast milk. His MDS was negative. Subsequently, his mother reported 4 years of Kratom use as means to stay away from heroin. She also mentioned that Kratom is over-the-counter and easily available at gas stations. The patient required a 30 days whole month of methadone wean before he was successfully discharged home.

Final Diagnosis: Neonatal Abstinence Syndrome secondary to Kratom use

Management: Conventional Methadone wean protocol

**Learning Objectives**

1. To spread awareness about the effects of maternal use of Kratom, which is a novel substance, among both mothers and healthcare workers to prevent NAS secondary to its use

Upon completion of this lecture, learners should be better prepared to identify Kratom use as a potential cause of NAS especially among newborns with negative UDS and MDS and a dubious maternal history. In addition, they should educate mothers about the harmful potential of this supplement and its effects on their newborn.



## Facilitators and Barriers associated with Mentoring Relationships from Medical Students' Perspective – A Multi-Institutional Cross-Sectional Study

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Bioethics & Medical Education

### Abstract

**Background/Knowledge Gap:** Mentoring is important for both professional and personal development in medical education. However, the characteristics of mentoring relationships among medical students are not well characterized. Despite its importance, the prevalence medical student mentorship ranges dramatically between 26%-77%, with studies primarily focusing on a specific population of medical students. The primary goal of this study was to update and determine the rate of mentorship among medical students across medical schools in the United States. The secondary goals were to assess the facilitators and barriers associated with finding a mentor and the desired qualities of a successful mentor from the perspective of medical students across all four years of medical school.

**Methods/Design:** A cross-sectional online survey was administered via Qualtrics to all undergraduate medical students at participating accredited medical schools from July 2018 to March 2019. The 42-question survey contained a sub-section of 11 questions which assessed the presence of mentoring among each responder, the setting of how the mentor was obtained, and facilitators and barriers in finding a mentor, and the desired qualities in a successful mentor. Item formats included yes/no questions, a 5-point Likert scale, "choose up to 3" qualities, and demographic information. Post hoc analysis revealed a sample size of 532 students provides 95% confidence with a margin of error of  $\pm 4$  which makes the sample adequately representative.

**Results/Findings:** Nineteen (32%) of 59 responding medical schools (17 public and 2 privately funded) responded and participated in the study. With a 94% completion rate, 369 (69%, n=532) of medical students reported having a mentor. Fourth-year medical students were significantly more likely to have a mentor compared with first-year (OR 1.98; 95% CI 1.14, 3.46; p=0.016), second-year (OR 1.9; 95% CI 1.06, 3.39; p=0.03) or third-year students (OR 2.58; 95% CI 1.45, 4.60; p=0.001). Compassion (64%) and lack of time from mentor (75%) were the most commonly reported quality and barrier of a successful mentoring relationship, respectively.

**Conclusions/Implications:** Medical students desire mentors to guide them through their medical education. This study defines the desired qualities of mentors and may serve as a guide to fostering more supportive mentoring relationships. However, each mentoring relationship should be tailored to the needs of the mentee.

### Learning Objectives

- Know the incidence of mentoring among medical students across the United States
- Know the most commonly reported quality of a successful mentor from a medical student's perspective
- Know the most commonly reported barrier in preventing a successful relationship

## Surveying the Opinions of Urology Program Directors Regarding the Change of USMLE Step 1 Scoring to Pass/Fail

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Bioethics & Medical Education

### Abstract

#### Background:

Step 1 is an exam required of medical students as part of licensing which assesses knowledge and application of basic science concepts relating to medicine, and assigns students a numerical score, with 194 as the minimum to pass. Recently, the USMLE announced that Step 1 reports will change from a numerical grade to pass/fail.

#### Goal:

To assess the opinions of urology residency directors toward this scoring change.

#### Methods:

Program directors were contacted through their contact information listed by the AUA and FREIDA. Using a Likert scale, respondents were asked 14 questions about their current use of Step 1 scores in resident selection, their opinions about the switch to pass/fail scoring, and anticipated changes to their residency match process

#### Results:

38 of 145 program directors responded to the survey (26% response rate). 76% of respondents strongly or somewhat agreed when asked if USMLE scores played an important role in ranking applicants. 63% of programs reported using Step 1 cutoffs, with the average reported at 230.5. 70% of respondents strongly or somewhat agreed that a high Step 2 CK score can increase the chances of selection despite a low Step 1 score. 66% of respondents believed that the prestige of an applicant's medical school would become more important. 84% of respondents strongly or somewhat agreed that selecting applicants would be more difficult without a numerical Step 1 score. Only one respondent marked an anticipated Step 2 CK score cutoff, set to 240. 45% of respondents indicated that they would institute a cutoff but had not selected a value, while 53% indicated that they would not implement a cutoff.

#### Conclusions:

The Step 1 score is currently an important metric used by residencies. Program directors expressed some concern that the change to pass/fail may make resident selection more difficult.

### Learning Objectives

1. To examine the current role of Step 1 in urology residency selection
2. To assess opinions of Urology program directors regarding the upcoming change to pass/fail scoring

## Assessing the efficacy of didactic modules in training health care professionals in interprofessional geriatrics care

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Bioethics & Medical Education

### Abstract

**Background:** The population of Americans aged 65 years or older will account for roughly 20% of the U.S. population by 2030. According to the National Council on Aging, roughly 80% of older adults have at least one chronic disease, such as hypertension, cardiovascular disease, and diabetes. Florida is the third most populous state in the U.S., behind California and Texas. According to the American Geriatrics Society's Geriatrics Workforce Policy Studies Center as of 2016, the U.S. overall had a shortfall of more than 13,000 geriatricians. Given the impossibility of engaging and training a sufficient number of geriatricians to meet the growing and evolving needs of older adults, it is critical for primary care professionals, residents, and students from all health care disciplines to be trained in interprofessional geriatric care to meet current and emerging needs.

**Method:** Nova Southeastern Geriatric Workforce Education Program provided didactic training modules to the Site 1 and Site 2 primary care professionals, residents, and students. The objective was to build competencies to ensure that all providers have the knowledge and skills to provide care for older adults with chronic illnesses using didactic training in several topics. Pre-Post data was collected through REDCap™, a mature, secure web application for building and managing online surveys and databases.

**Results:** Diabetes Module: After the didactic module, the percentage of healthcare professionals with high knowledge of the topic improved from 0% to 41.6% at site 1 and from 19.2% to 46.2% at site 2.

Cardiac Failure Module: After the didactic module, the percentage of healthcare professionals with high knowledge of the topic improved from 9% to 36.4% at site 1 and from 12% to 50% at site 2.

Oral Health Module: After the didactic module, the percentage of healthcare professionals with high knowledge of the topic improved from 20% to 60% at site 1 and from 3% to 25% at site 2.

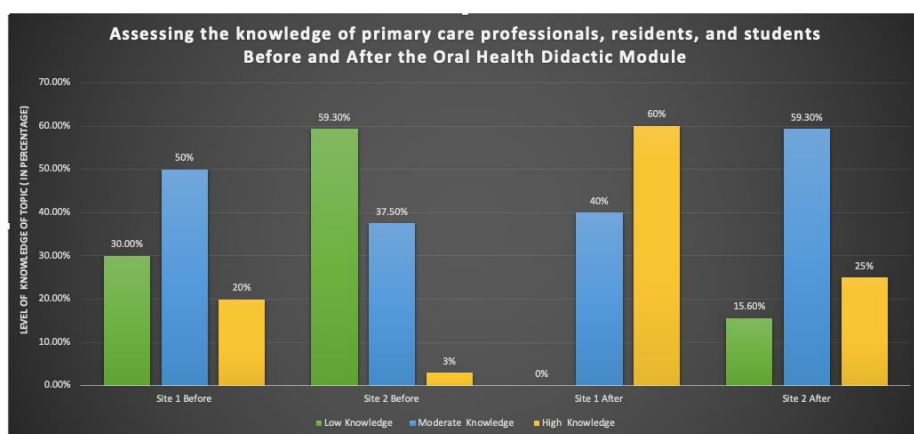
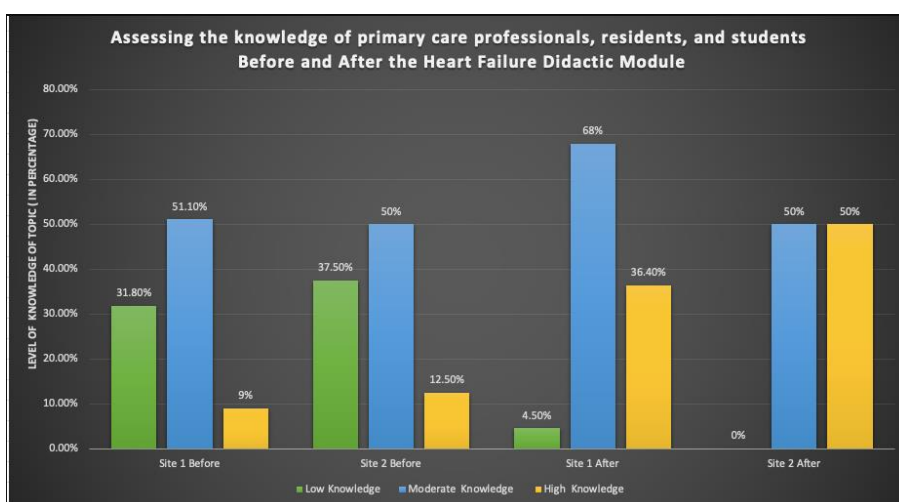
**Conclusion:** Feedback from the didactic training indicated improvement in the knowledge of the participants, suggesting a sustainable training program on geriatric issues.

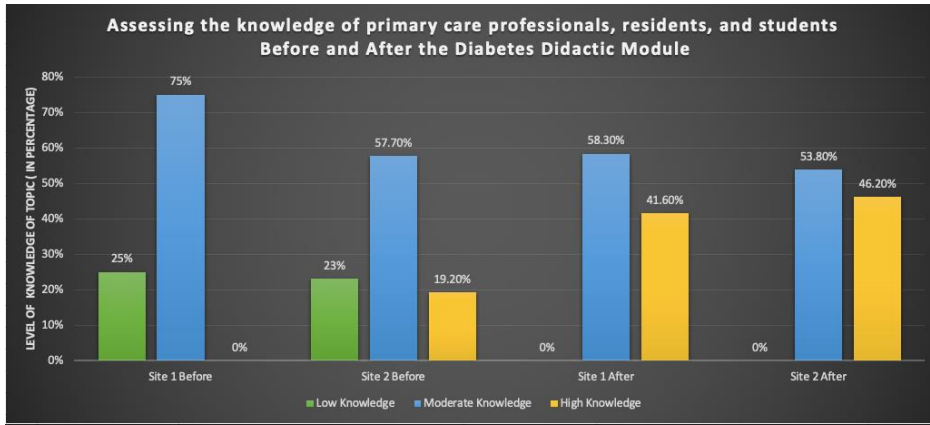
### Learning Objectives

1. Educate health care professionals-residents and fellows on promoting geriatrics competencies
2. Educate health care professionals- residents and fellows on awareness of social determinants of health
3. Educate health care professionals- residents and fellows on person-centered care in age-friendly health systems

Tables and/or Figures

<b>DEMOGRAPHICS</b>		
<b>Participants Characteristics</b>	<b>Site 1</b>	<b>Site 2</b>
<b>Total</b>	44	82
<b>Gender</b>		
<b>Female</b>	57%	41%
<b>Male</b>	39%	51%
<b>Not reported</b>	4%	8%
<b>Race</b>		
<b>Hispanic</b>	34%	27%
<b>Non-Hispanic</b>	59%	63%
<b>Unspecified</b>	7%	10%





## Mastocytic Enterocolitis in Systemic Mastocytosis: A Case Report

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Bioethics & Medical Education

### Abstract

Systemic Mastocytosis, a subcategory of mastocytosis, has many different extracutaneous manifestations including gastrointestinal (GI) tract involvement. While GI involvement can be deemed nonspecific due to generalized mast cell mediators from the disease, a mastocytic enterocolitis has only been recently described and studied. This case presents a 65-year old male with a six-month history of chronic diarrhea as well as severe allergic reactions who was diagnosed with mastocytic enterocolitis after endoscopy. A trial therapy with omalizumab was successfully used as treatment for both the GI and systemic manifestations of mastocytosis.

### Introduction:

Mastocytosis refers to a rare group of myeloproliferative disorders characterized by excessive mast cell proliferation in one or more tissues. It is subcategorized to either only involvement of the skin or the additional involvement of extracutaneous tissues, termed cutaneous mastocytosis (CS) and systemic mastocytosis (SM) respectively. Diagnosis of SM in particular frequently involves bone marrow biopsies which, through the guidelines set forth by the World Health Organization, use a combination of immunohistochemical, serologic, morphologic, and molecular findings.<sup>1</sup> Gastrointestinal (GI) tract involvement, with presenting symptoms as vague as diarrhea and peptic ulcer pain, is seen in 70-80% of individuals diagnosed with SM.<sup>2,3</sup> The exact explanation behind these symptoms is difficult to explain due to a multitude of different GI pathologies that have an increase in mast cell proliferation including inflammatory bowel disease, parasitic and bacterial infections.

GI symptoms may also be explained by the systemic effects of released mediators in SM making a pure diagnosis of extracutaneous involvement in the GI tract difficult.<sup>4</sup> Diagnosis of a mastocytic enterocolitis has only recently been described and is without consistent clinical or histologic criteria. For that reason, a thorough understanding of the clinical picture in conjunction with the histologic evidence is necessary. Treatment options vary depending on extent of the disease, but multiple studies have shown the efficacy of omalizumab in the treatment of indolent SM.<sup>5</sup> This case presents a patient with both the clinical and histological findings of mastocytic enterocolitis.

### Case Presentation:

A 65-year-old male presented with chronic intractable diarrhea over a six-month period. The patient described the stools as loose, watery and non-bloody. There were no new medications or dietary changes. Stool studies for clostridium difficile, Ova/Parasite and cultures. were all negative. Hydrogen breath testing and celiac antibody screening were also negative. His medical history was notable for a new onset of rashes, hives, urticaria, and episodes of anaphylaxis which have progressively worsened over the last 12 months. The patient has used cetirizine (Zyrtec) 20 mg twice a day as well as montelukast (Singulair) but did not show significant improvement. Pulmonary function tests were subsequently performed and yielded a forced expiratory volume (FEV1) 68% of the predicted value. There was also a 7% increase after the addition of a bronchodilator.

An esophagogastroduodenoscopy (EGD) and colonoscopy were performed to further evaluate his diarrhea. Biopsies were obtained from four different locations along the GI tract for histopathology, including CD117 (c-KIT) immunohistochemical (IHC) stain; (1) The fourth part of the small bowel showed approximately 25 mast cells/high power field (HPF), (2) The stomach body showed approximately 17-20 mast cells/HPF, (3) The terminal ileum showed

approximately 30 mast cells/HPF, and (4) Random colon specimens showed approximately 30 mast cells/HPF. The pathology was otherwise negative for features such as celiac disease, eosinophilia, microscopic colitis and inflammatory bowel disease. Using a criterion of greater than 20 mast cells by IHC/HPF, the findings supported a diagnosis of mastocytic enterocolitis. After coordination with an allergist, the patient was given omalizumab, an anti-IgE monoclonal antibody, which showed significant improvement in the patient's systemic allergy response as well as his chronic diarrhea.

#### Discussion:

When diagnosing SM, it is important to follow the WHO guidelines which require either the presence of one major and one minor criterion or the presence of three minor criteria. The major criterion is the presence multifocal, dense infiltrates of greater than or equal to 15 mast cells detected in sections of bone marrow and/or other extracutaneous organs through the use of tryptase or other special stains. The minor criteria are as follows; (1) Presence of greater than 25% atypical or spindle-shaped mast cells in extracutaneous organ(s), (2) Detection of the receptor tyrosine kinase KIT (CD117) mutation D816V in extracutaneous organ(s), (3) Expression of CD2 or/and CD25 in extracutaneous mast cells, and (4) Serum tryptase concentration > 20 ng/mL (with the exception of cases with associated clonal myeloid neoplasm).<sup>1</sup> Tryptase and CD117 in particular are expressed in both normal and neoplastic mast cells which make them very useful in identifying and quantifying mast cells in tissue via immunohistochemistry.

While GI manifestations are extremely common in SM, other inflammatory disorders can also lead to increases in mast cells throughout the GI tract, making the diagnosis challenging in some cases. For this reason, the clinical history is paramount in deciding further steps. Endoscopy with biopsies is essential to not only cement a diagnosis but to also rule-out other potential causes of diarrhea. There are many different presentations of the mucosa including nodules, pigmented areas, neutrophilic cryptitis, crypt abscess formations, intraepithelial lymphocytosis, granulomas, or thickened folds, but the mucosa may even appear normal.

There are multiple conflicting reports on GI mast cell densities in patients diagnosed with SM. Some studies report aggregates of mast cells up to 100/HPF, while other studies have varied far more with scattered results ranging from diffusely increased all the way to decreased numbers of mast cells when compared to controls.<sup>6</sup> Another study in 2006 found 20 mast cells/HPF in a group of patients with chronic intractable diarrhea who didn't have evidence of mastocytosis or other inflammatory disease, subsequently labeling these patients with mastocytic enterocolitis.<sup>7</sup> A more recent study in 2007 compared mast cells in biopsies from patients with mastocytosis to a control group of multiple inflammatory disorders. The results showed mast cells numbered at an average of 196/HPF in SM and aggregates of sheets of mast cells that were not seen in other biopsies. All other controls, excluding parasitic infections, were significantly less ranging between 3-70/HPF.<sup>8</sup>

A recent article published in *The Journal of Allergy and Clinical Immunology* presented a study on 55 French patients with mast cell disorders.<sup>9</sup> The results of the study revealed 78.2% of patients had favorable results while on omalizumab therapy. Dramatic improvement in superficial, vasomotor, GI, urinary, and even partially in most neuropsychiatric symptoms were all evident within the first 2-6 months on therapy. Given our patients clinical history of chronic intractable diarrhea and allergies along with the results of the biopsies, omalizumab treatment was given and showed quite favorable results.

#### Conclusion:

Mastocytic enterocolitis as a manifestation of SM should always be kept in the differential diagnosis in patients with chronic diarrhea with a clinical history closely resembling a mast cell disorder. Endoscopic assessment using immunohistochemical stains is necessary to further establish a diagnosis. While studies are still very limited and conflicting, more research needs to be done to enable better diagnostic criteria to aid in treatment of these patients.

#### Learning Objectives

1. To aid in the identification of the recently described subtype of Systemic Mastocytosis, Mastocytic Enterocolitis
2. To encourage the establishment of proper guidelines for the diagnosis and treatment of Mastocytic Enterocolitis

## Paternalism in the Medically Underserved Patient: A Case Report

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<b>Disclosure Information</b>	Authors and Co-authors have no relevant financial relationships to declare.
<b>Supplemental Video</b>	<a href="#">Supplemental Video</a>
<b>Category</b>	Bioethics & Medical Education

### Abstract

#### Introduction

The role of the doctor-patient relationship is a rapidly changing entity from a purely paternalistic model to one of shared decision making. Ideally the relationship should be governed by the Four Principles of Medical Ethics: autonomy, beneficence, non-maleficence, and justice. The two Principles involved in the balancing of paternalism in the delivery of healthcare are autonomy and beneficence. When there are clear limitations to a patient's autonomous decision making, such as lack of capacity, the case for paternalism is more easily justified. A stronger form of paternalism arises when the two values appear incompatible. In these instances, paternalism that overrules a patient's autonomy in the moment, must serve the purpose of promoting greater autonomy for the patient moving forward. Striking the balance between autonomy and beneficence when the two principles are at odds is part of the art of medicine.

#### Case Presentation

Patient is a homeless 59 year old male with past medical history significant for alcoholic cirrhosis with recurrent ascites first diagnosed in 2017, chronic alcohol, tobacco, and cocaine use disorder which he was unwilling or unable to abstain from despite its health impacts. He comes into the Emergency Department (ED) three times weekly for a paracentesis many times leaving against medical advice (AMA) prior to paracentesis. Patient has had relatively minor medical consequences of his lifestyle choices until approximately one year ago when he was hospitalized after a mild episode of hematemesis which required a blood transfusion during which time he had repeatedly refused endoscopic procedures or ways to identify any bleeding. Due to the increasingly erratic behavior, including leaving AMA from the ED three times in one day, over 150 times in the previous year, and being verbally and physically abusive to staff, a psychiatrist determined that the patient lacked capacity to make medical decisions. A court appointed guardian was obtained and the patient was treated during a three month period of involuntary commitment (IVC). Decision-making in this case was difficult in light of the patient's assertion that his independence and quality of life (QOL) were most important to him. Since each individual patient has their own beliefs about what qualifies as an acceptable QOL, and this patient's acceptable QOL included eating, drinking alcohol, and being able to receive medical care under his own terms. Understanding the value of treatment in preserving the patient's autonomy in the future held weight in making medical decisions on his behalf. Following his IVC, the patient required frequent hospitalizations. Despite having a guardian to consent to treatment, he continued to refuse medical treatment, including paracenteses. The medical team had to make the decision about how to proceed with his treatment.

#### Final Diagnosis

The sentinel event occurred when Patient came in with massive hematemesis requiring ICU admission and intubation. The guardian consented to emergency EGD which found Grade 3-4 esophageal varices with active bleeding which were amenable to intervention. With appropriate medical therapy, Patient was extubated and transitioned to a general medical floor where he continued to fail speech language pathology evaluations and alternative forms of feeding were explored, which patient declined despite his guardian consenting to them. A



difficult to answer question developed from treating this patient: to what extent do individuals with substance use disorders have free will and do they even have the ability to make their own complex medical decisions?

#### Outcome

This case illustrates an important concept in modern medicine with patients living longer and with a different QOL than in the past: at what point does a patient lose the capacity to make medical decisions for themselves? The determination of decision-making capacity possibly has different thresholds based on the gravity and complexity of the decision being made. The same patient may be deemed to have capacity to make everyday decisions while not having capacity to make medical decisions. Since this patient was well known to the service, we took what he had said in the past into account, as consistency is an integral part of capacity. He had previously indicated that he would not have liked to be on long term ventilation, have chest compressions, or to live if he was unable to eat. After given an opportunity to eat and then aspirating on his meals, he stated that he would prefer for hospice to get involved again and transition to comfort care. At this point, the benefit of treatment would have diminishing returns and we felt that this was a decision that he was capable of making with or without his guardian's approval, and aligned with his long maintained desire that QOL and independence were most important to him. As easy as it would have been to write the Patient off as having no capacity and acting paternalistically, in the end, treating physicians must have the patient's best interest at heart and allowing this patient to have his wishes heard was of utmost importance to him and he was ultimately satisfied with the outcome.

#### Learning Objectives

Upon completion of this lecture, learners should be better prepared to determine how to balance paternalism and autonomy in medical decision making.