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Student Poster Submissions

# Utilizing Quantitative COVID-19 Serological Testing to Assess Pathophysiological Importance of Complement Activation in Disease Severity

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## Background

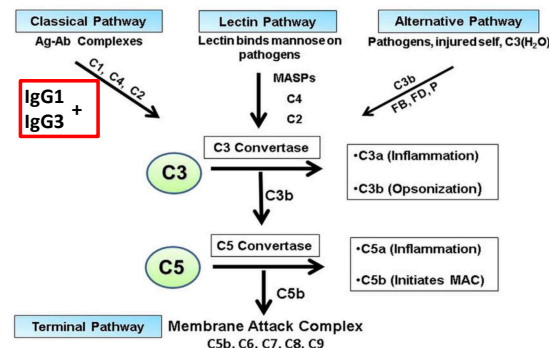
**Rationale:** The COVID-19 pandemic continues to cause high disease burden in the U.S. and world. Not enough is known about immunological mechanisms driving disease severity in individuals hospitalized due to SARS-CoV-2 complications compared to those with asymptomatic or non-severe disease progression. The innate immune response, possibly through complement activation, may be a major contributor to disease severity.

**Hypothesis:** Complement activation is partially driving excessive immune response in most severe SARS-CoV-2 cases.

- Focused on **Classical Complement Pathway**
  - C1q factor binds to 2 molecules of IgG
  - Immunoglobulin subclasses **IgG1** and **IgG3** bind most strongly to C1q
  - IgG1 and IgG3 antibodies against SARS-CoV-2 RBD (receptor binding domain) spike protein are measurable in serum

**Expected Results:** Higher mean titer levels of IgG1 and IgG3 antibodies against SARS-CoV-2 RBD spike protein in sera of subjects hospitalized due to COVID-19.

**Figure 1.** Overview of Complement Cascade Pathways

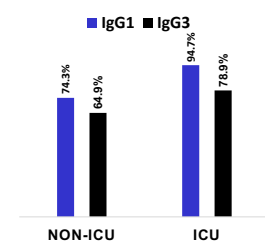


## Participant Data

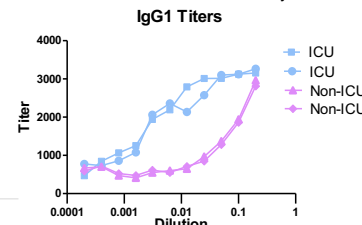
**Table 1:** Subject demographics

	Non-ICU	ICU	Total Subjects
	75 (79.8%)	19 (20.2%)	94
<b>Sex</b>			
Female	32 (43.8%)	10 (52.6%)	42 (45.2%)
Male	42 (57.5%)	9 (47.4%)	51 (54.8%)
<b>Race</b>			
White/Caucasian	47 (63.5%)	5 (26.3%)	52 (55.9%)
African American	19 (25.7%)	12 (63.2%)	31 (33.3%)
Other	8 (10.8%)	2 (10.5%)	10 (10.8%)
<b>Age</b>			
<65 years	58 (80.6%)	9 (47.4%)	67 (73.6%)
≥65 years	14 (19.4%)	10 (52.6%)	24 (26.4%)

**Figure 2.** IgG1 and IgG3 seropositivity.



**Figure 3.** IgG1 titer values by dilution in individual Non-ICU and ICU subjects.



## Methods

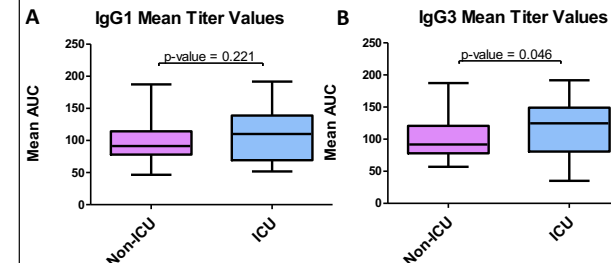
**ELISA Protocol Set-Up:** Immunolon plates were coated with RBD (Spike) at 0.1mcg/well in 0.9M Na<sup>+</sup> carbonate buffer, pH=9.5 (RayBiotech) and incubated overnight at 4°C. Washed and blocked at RT for 1 hr. One of the following assays then conducted.

- **Seropositivity assays.** 100μL/well of the 1:40 diluted serum samples were incubated at RT for 1 hr
- **Titer assays.** Started at 1:5 dilution followed by 2-fold dilutions up to final dilution of 1:5120. Incubated at RT for 1 hr
  - For both assays, goat-anti-human IgG1 and IgG3 conjugated to alkaline phosphatase (Invitrogen) added to plates, incubated at RT for 1 hr. Developed with Sigma 104 phosphatase substrate and read at 450nm on Biohit BP800 ELISA reader

**Statistical Methods:** Two-sample unpaired t-tests, Fischer's exact tests, and chi<sup>2</sup> tests used to analyze data

## IgG Subtypes in Non-ICU vs. ICU

**Figure 4.** A. Comparison of mean IgG1 titer values between Non-ICU and ICU subjects. B. Comparison of mean IgG3 titer values between Non-ICU and ICU subjects.



## Conclusions

- Higher mean IgG1 and IgG3 seropositivity in ICU subjects
- Statistically significant difference between Non-ICU and ICU subjects in titers for IgG3 (p-value = 0.046)
- ICU study population had higher proportion of African-Americans and individuals ≥65 years but limited interpretability
- Small sample size may be suppressing magnitude of results
- New research exploring roles of the Lectin Pathway and Alternative Pathway in complement-driven severity

## References & Acknowledgments

- Amanat et al. (2020) A serological assay to detect SARS-CoV-2 seroconversion in humans. Nature Medicine. 26: 1033-1036.
- de Nooijer et al. (2021) Complement activation in the disease course of coronavirus disease 2019 and its effects on clinical outcomes. The Journal of Infectious Diseases. 223: 214-224.
- Magro et al. (2020) Complement associated microvascular injury and thrombosis in the pathogenesis of severe COVID-19 infection: A report of five cases. Journ of Laboratory and Clinical Med. 220: 1-13.
- Vidarsson et al. (2014) IgG subclasses and allotypes: from structure to effector functions. Frontiers in Immunology. 5: 1-17.

Much appreciation goes to Jennifer Cameron, PhD<sup>2</sup>, who provided valuable feedback. In addition, the project could not have been possible without the contributions of serum donors. This research project was supported through the LSU Health Sciences Center, School of Medicine.

### Background:

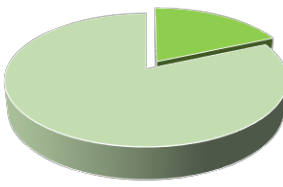
- ❖ Retrospective study of patients from an underserved community in New Orleans at a primary care clinic 1-month after Hurricane Ida
- ❖ Timeline:
  - ❖ Landfall: Aug 29<sup>th</sup>, 2021
  - ❖ Clinic Open: Sep 13<sup>th</sup>, 2021
  - ❖ Data Collection: Sep 13<sup>th</sup>- Oct 15<sup>th</sup>, 2021

Total Patients (N)	237
Male	135 (57%)
Age	50.9 +/- 11.2 years
African American	121 (51%) [US: 12%]
Hypertension	135 (57%) [US: 47%]
Diabetes Mellitus, Type 2	45 (19%) [US: 10%]
Chronic Kidney Disease	33 (14%) [US: 11%]

### Results:

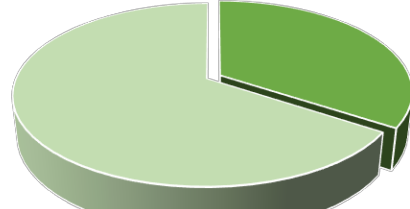
Vital/ Lab Value	Pre-Ida Measurement	Post-Ida Measurement	P-Value
Systolic BP (In HTN Patients)	131.2 mmHg	138.6 mmHg (Diff: +7.2 mmHg)	p=0.012
Hemoglobin A1c (In T2DM Patients)	6.91%	7.23% (Diff: +0.32%)	P=0.043
Calculated GFR (In CKD Patients)	73 ml/min/1.73m <sup>2</sup>	62 ml/min/1.73m <sup>2</sup> (Diff: -11 ml/min/1.73m <sup>2</sup> )	P=0.030

18.4% reported Gaps in Med Access



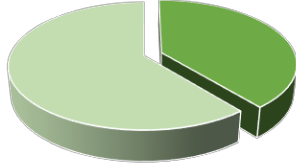
■ Yes ■ No

34.2% reported Delays of Care



■ Yes ■ No


52.6% reported Displacement-Induced Stresses



■ Yes ■ No

### Future Directions:

- ❖ Systemic awareness for comorbidity exacerbations following disasters
- ❖ Develop training courses for PCP/Pharmacy to promote proactive outreach
- ❖ Creation of standardized disaster preparation procedures





# Interpreting Patient Perception of Bankart Repair via Social Media

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## Introduction

- There is limited data on patient perception and satisfaction of Bankart Repair
- Social media has been used in prior studies to examine patient satisfaction with various orthopaedic procedures:
  - Hip arthroscopy<sup>1</sup>
  - Total joint arthroscopy<sup>2</sup>
  - Spinal Fusion<sup>3</sup>
  - Shoulder and Elbow Surgery<sup>4</sup>

## Disclosures

None.

## Study Design

Cross Sectional Study; Level of Evidence: 3

## Purpose

The purpose of this cross-sectional study was to analyze publicly available posts on Instagram and Twitter to gain an understanding of patients' perspectives regarding Bankart repair.

## Methods

- Public posts on Instagram and Twitter were queried from June 1, 2019 to June 1, 2020 with the following hashtags: #Bankart #Bankartrepair #Bankartlesion #labrumrepair #labralrepair #shoulderdislocation
- A binary categorical system was used for media format (picture or video), perspective (patient, family or friend, physician, hospital or physical therapy group, professional organization, news media, or industry), timing (preoperative, postoperative, nonoperative), tone (positive, negative, or neutral), content (surgical site, hospital or surgeon, imaging, rehabilitation, activities of daily living (ADLs), return to work, surgical instruments, or education), post popularity (number of likes), and geographic location

## Results

1554 Instagram posts were identified:

- 62.6% (722) made by patients
- 52.0% (600) = positive
- 35.3% (407) = neutral
- 57.8% (667) = post-operative

Most common content included in Instagram posts:

- Activities of Daily Living (ADL) 50% (577)
- Education 20.2% (233)
- Rehabilitation 19.6% (226)

Average Likes: 117 (0-7040)  
Geotags: 49 different countries



155 Twitter posts were identified:

- 59.4% (92) made by physicians
  - 72.9% (113) = neutral
  - 81.9% (127) = non-operative,
- Most common content included:
- Education 83.9% (130)
  - Activities of Daily Living: 7.1% (11)
  - Hospital or Surgeon: 3.9% (6)
- Average Likes: 3.2 (0-59)  
Geotags: 4 different countries



## Discussion

- Prior studies examining patient outcomes and satisfaction with respect to Bankart repair have been limited by small patient cohort sizes
- Social media analysis provides information about patient outcomes and satisfaction for a large number of patients
- Most common content posted was posted on Instagram and Twitter were related to on ADL, rehabilitation, and educational topics
- Our results are similar to a study performed by Rizalla et al. who noted that there was a majority of social media posts related to spinal fusion primarily focused on returning to daily activities<sup>3</sup>
- Compared to Instagram posts, Twitter posts were markedly different in terms of their perspective, content, and tone. Twitter posts were mostly from the perspective of physicians, educational, and neutral

## Conclusion

- Majority of patients undergoing Bankart repair had a positive tone when discussing the procedure on social media
- Instagram posts were made by mostly made by patients post-operatively and on activities of daily living.
- Twitter posts were mostly made by physicians that provided educational content with a neutral tone

## Acknowledgments and Permissions

Tulane University School of Medicine, Department of Orthopedics

## References:

1. Ligament Surgery: An Analysis of Patient, Surgeon, and Hospital Use. *Arthroscopy*. 2017;33(3):579-585.
2. Ramkumar PN, Navarro SM, Haeberle HS, Chughtai M, Flynn ME, Mont MA. Social Media and Total Joint Arthroplasty: An Analysis of Patient Utilization on Instagram. *J Arthroplasty*. 2017;32(9):2694-2700.
3. Rizkalla JM, Holderread B, Hotchkiss W, et al. Instagram and Spine Fusion: An Analysis of Social Media and Its Relationship to Patient Perception of Surgery. *Global Spine J*. 2021;21925682211001814.
4. Ramkumar PN, Navarro SM, Cornaghi MM, et al. Social Media in Shoulder & Elbow Surgery: An Analysis of Twitter and Instagram. *Int J Sports Med*. 2018;39(7):564-570



# Clinical and Demographic Factors Among Patients Suffering Cardiac Arrest with Field Termination During the COVID-19 Pandemic

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## Introduction

- Since the start of the COVID-19 pandemic, resuscitating and treating patients with out-of-hospital cardiac arrest (OHCA) has posed new challenges
- Following termination of resuscitation (TOR) rules have become more risky and even confusing for first responders
- Following modified TOR protocol can impact factors that affect patient OHCA survival
- TOR rates have measured higher in 2020 than in 2019 in many cities across the world (data is heavily dependent on location)
- Emergency department visits have decreased in the United States for nonspecific chest pain and acute myocardial infarction

## Objectives

- Determine if there are any associations between clinical and demographic factors and field termination due to cardiac arrest
  - Determine what these factors are
  - Determine if there are factors that are more predictive of cardiac arrest termination in the field
- Determine if there has been an increase in the number of cardiac arrest with field termination during the COVID pandemic in New Orleans
- Determine the frequency of comorbidities among patients that have experienced cardiac arrest during the COVID-19 pandemic

## Methods

A retrospective analysis of patients was performed. We queried the NOLA EMS medical records for patients meeting study criteria and collected basic demographics, comorbidities, and information related to the code. Data was extrapolated to Redcap and analyzed using SAS 9.4. Correlations between variables were assessed utilizing Fisher's exact test. We also compared the number of DNR calls prior to and during the first six months of the COVID pandemic.

## Eligibility Criteria

### Inclusion Criteria:

- Anyone greater than or equal to the age of 18
- Anyone experiencing a cardiac arrest with field termination eliciting EMS activation prior to (January 1, 2019 – June 30, 2019) and during (January 1, 2020 – June 30, 2020) the COVID-19 pandemic

### Exclusion Criteria:

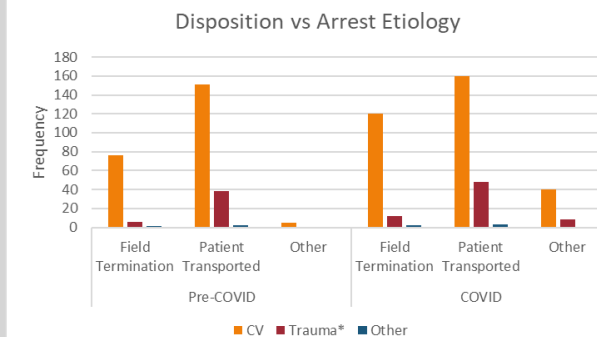
- Anyone younger than 18 years of age
- Anyone older than 18 years of age who did not experience a cardiac arrest with field termination eliciting EMS activation prior to (January 1, 2019 – June 30, 2019) and during (January 1, 2020 – June 30, 2020) the COVID-19 pandemic

## Results: Basic Demographics

		Pre-COVID		COVID	
		n=	%	n=	%
Age, mean		59.9		58.2	
Race	White	75	27.08	89	24.38
	Black	194	70.04	255	69.86
	Hispanic	2	0.72	12	3.29
	Asian/other	6	2.17	9	2.47
Gender	Male	178	64.03	231	62.1
	Female	100	35.97	141	37.9
Arrest Etiology	Cardiovascular	232	83.15	320	81.42
	Trauma, etc. *	44	15.77	68	17.3
	Other	3	1.08	5	1.27
Disposition	Field Termination	83	29.75	134	34.1
	Patient Transported	191	68.46	211	53.69
	Other	5	1.79	48	12.21

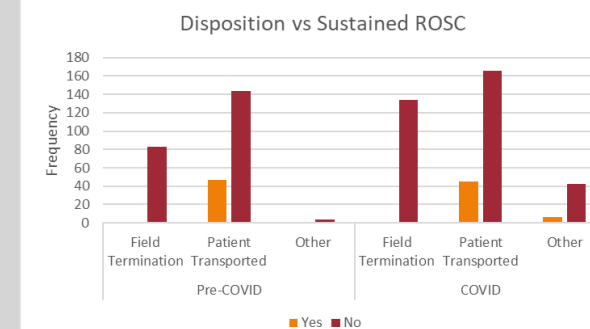
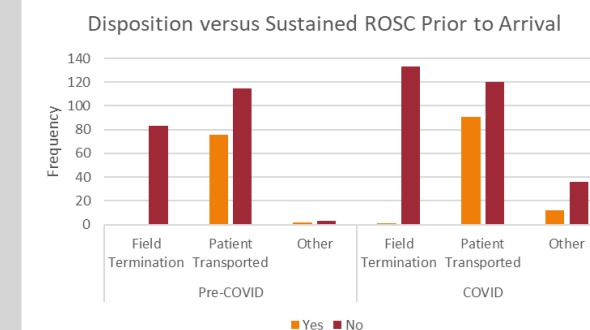
\*Trauma, exsanguination, drowning, and overdose

## Results:



In the cases analyzed from 2020 during the COVID-19 pandemic, a statistically significant relationship was found between the disposition of the cardiac arrest and the etiology of the arrest, with a p value of 0.0114.

## Results:



In the cases analyzed in both 2019 and 2020, a statistically significant relationship was found between the disposition of the cardiac arrest and achievement of sustained return of spontaneous circulation (ROSC), both prior to EMS arrival and during the incident.

## Conclusions

- Achieving return of spontaneous circulation in the field following cardiac arrest had a strong impact on whether or not the incident was terminated in the field
- The etiology of the cardiac arrest greatly determined whether the cardiac arrest incident was terminated in the field or whether the patient was transported to a hospital
- Greater investigation is necessary to explore the exact determinants in these relationships
- Other factors of the incidents, such as demographics, postal code, hospital destinations, and health insurance should be explored

# A CRAB-y Diagnosis: Multiple Myeloma

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## Learning Objectives

- Discuss and recognize the presentation of Multiple Myeloma (MM)
- Identify an uncommon manifestation of multiple myeloma, plasmacytoma

## Patient Presentation

**58-year-old male with PMH of follicular lymphoma in remission, treated Hepatitis C, and HTN.**

### Presenting symptoms

- Severe abdominal pain
- Generalized fatigue
- Low back pain, radiating down his right leg

### Medications

- Lisinopril 10mg daily

### Social History

- 52 pack-year smoking history

## Notable Initial Work Up

### Vitals:

- Heart Rate- 120 beats per minute

### Labs:

- Hemoglobin- 9 gm/dL
- Creatinine- 1.98 mg/dL (baseline ~ 1 mg/dL)
- Serum Calcium- 19.8 mg/dL
- Ionized Calcium- Above 10 mg/dL
- PTH/PTHrp- Within normal limits

## Differential Diagnosis

- Recurrence of Lymphoma
- Multiple Myeloma (MM)
- Lung Malignancy
- Hepatic Cellular Carcinoma

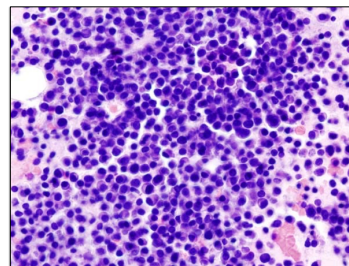
## Diagnosis

### Further Work Up

- **Serum Protein Electrophoresis (SPEP)**- Slight increase in Alpha 2 globulin and M spike
- **Urine Peptide Electrophoresis (UPEP)**- Monoclonal band in the late kappa region of IgG
- **CT Abdomen and Pelvis**- Lymphadenopathy congruent with lymphoma in remission
- **CT Chest**- Osseous lesions in Spine
- **MRI Lumbar Spine**- 6.6 x 5.4 x 6.3 cm mass at the level of L5

### Diagnosis Confirmation

- Bone marrow biopsy confirmed MM
- Biopsy of mass confirmed a plasmacytoma



**Pictured: Example of MM bone marrow aspirate<sup>1</sup>**



**Pictured: MRI Lumbar Spine with mass and bone lesions**

## Multiple Myeloma (MM)

MM is a “clonal plasma cell proliferative disorder characterized by the abnormal increase of monoclonal paraprotein leading to evidence of specific end-organ damage.”<sup>2</sup> Median age is about 70 years old and makes up 1.8% of all cancers.<sup>2</sup>

## Common Clinical Manifestations

Calcium (elevated)

Renal dysfunction

Anemia

Bone lesions



## Discussion

- The patient’s previous diagnosis of lymphoma was a red herring despite meeting all the CRAB criteria.
- His back pain presented more like sciatica than classic lytic bone lesions, now it is known that the pain was due to large plasmacytoma.
- Plasmacytoma's are a rare presentation of MM, only being reported in 3% of cases.<sup>3</sup>

## Acknowledgments and Permissions

- Our patient gave us consent for this vignette; we are very grateful for his support.

## References

1. Ramani, MD, D. (2013). *Myeloma : Bone Marrow* [Photograph]. <https://www.webpathology.com/image.asp?case=768&n=29>
2. Albagoush SA, Azevedo AM. Multiple Myeloma. [Updated 2021 Jul 30]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK534764/>
3. Dorez GM, Landgren O, McGlynn KA, Curtis RE, Linet MS, Devesa SS. Plasmacytoma of bone, extramedullary plasmacytoma, and multiple myeloma: incidence and survival in the United States, 1992-2004. *Br J Haematol*. 2009 Jan;144(1):86-94. doi: 10.1111/j.1365-2141.2008.07421.x. Epub 2008 Nov 11. PMID: 19016727; PMCID: PMC2610331.

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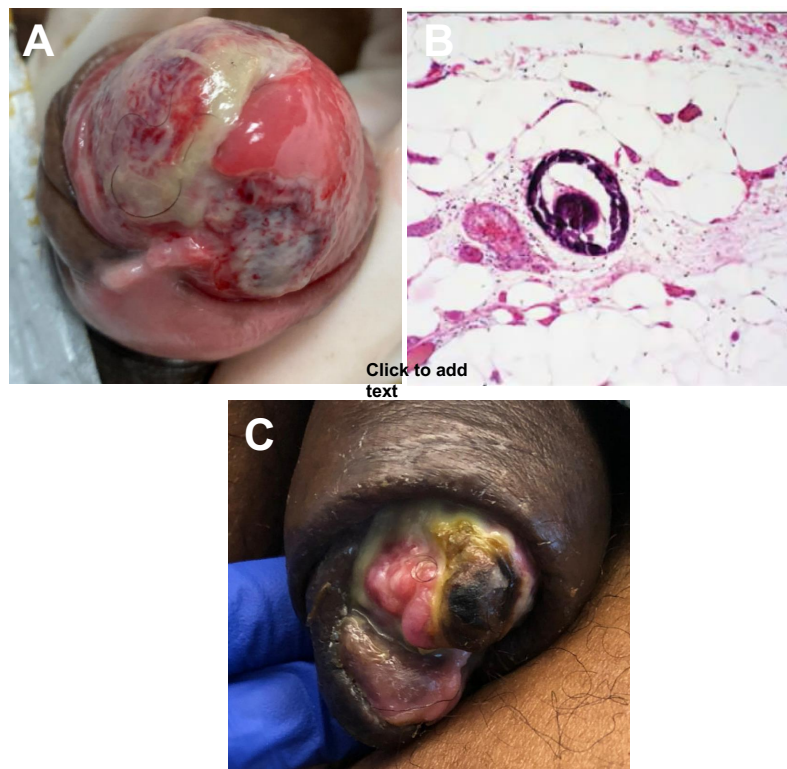
## Introduction

- ❖ Calciphylaxis, or calcific uremic arteriolopathy ('grey scale'), predominantly affects ESRD patients on HD
- ❖ Exact pathophysiology is unknown, but it is characterized by calcium deposition and subsequent small vessel occlusion and thrombosis of dermal/subdermal adipose tissue which leads to necrosis and gangrene ('metastatic calcification')
- ❖ While rare (prevalence is 1-4% of HD patients), 6-month mortality is 80-90%
- ❖ Lesions most commonly present on abdomen and thighs (highest adiposity)
- ❖ Treatment modalities include intensive wound care, debridement and infection control, sodium thiosulfate, parathyroidectomy, and maintaining low levels of phosphate and Ca x P product

## Case Presentation

- ❖ A 50 year old man with ESRD on HD (for 6 yrs), mechanical mitral valve on warfarin, T2DM, AoCD, HTN, HLD, chronic HCV, TB s/p tx, and bilateral below knee amputations secondary to MVC who presented to the ED with several months of worsening penile pain with discharge
- ❖ The pain was described as stabbing and concentrated at the glans of the penis
- ❖ Exam revealed penile tenderness and pain with retraction, phimosis, and an erythematous, ulcerated lesion on the glans with purulent exudate (Fig A)
- ❖ Vitals significant for hypertension, otherwise patient was afebrile with normal HR, RR, and oxygen saturation on room air
- ❖ CBC had no leukocytosis, UA was clean
- ❖ HIV, RPR, GC/CT negative
- ❖ Patient admitted for further workup of penile lesion, including Urology consult and biopsy

## Images



## Hospital Course

- ❖ Urology and Dermatology were consulted, biopsy showed thrombosis and intravascular calcification at the ulcer base consistent with calciphylaxis (Fig B - example of pathognomonic histopathology)
- ❖ Nephrology consulted, started thiosulfate during HD with some symptomatic improvement (along with intensive wound care) (Fig C), later stopped
- ❖ Warfarin (pt on for mechanical MV) was initially held out of concern for worsening calciphylaxis, Cardiology and Heme/Onc consulted for anticoagulation recommendations and patient then bridged with heparin, warfarin was resumed when deemed non-contributory
- ❖ Urology consulted, pt declined penectomy
- ❖ Patient briefly stepped up to ICU for hypoxic respiratory failure 2/2 volume overload, resolved with increased ultrafiltration
- ❖ Wound culture w/ *E. Coli*, *S. aureus*, and *Enterococcus*, ID consulted and patient received appropriate antibiotics (however likely contaminants)

## Discussion

- ❖ Calciphylaxis is a rare syndrome with high mortality
- ❖ Given the rarity of penile calciphylaxis, treatment options are mostly derived from case studies and without clear consensus
- ❖ For patients on HD, early recognition of skin lesions is paramount for improved survival – lesions typically present as pain or ulceration on adipose-rich tissues
- ❖ On presentation, the initial differential for this patient was infection vs malignancy
- ❖ The therapeutic intervention that best reduces mortality is aggressive wound care (including debridement) to reduce the risk of infection
- ❖ This case underscores the utility of IV sodium thiosulfate and improved control of hyperphosphatemia in treatment of penile calciphylaxis in patients who cannot or will not undergo curative penectomy

## References

- ❖ Sandhu G. Penile calciphylaxis: a life-threatening condition successfully treated with sodium thiosulfate. Am J Ther. 2012;Jan;19(1):e66-8.
- ❖ Karpman E, Das S, Kurzrock EA. Penile calciphylaxis: analysis of risk factors and mortality. J Urol. 2003 Jun;169(6):2206-9.

Table 1: Trend of parathyroid hormone throughout illness

	Prior to admit	During admission	On discharge
PTH	705.0	483.0	358.0



# COVID-19 Myocarditis: Quantitative Analysis of the Inflammatory Infiltrate and a Proposed Mechanism

Lacey Rogers<sup>1</sup>, Sharon Fox MD<sup>1,2</sup>, Richard Vander Heide MD<sup>1</sup>

Louisiana State University Health Sciences Center<sup>1</sup>  
Southeast Louisiana Veteran's Healthcare System<sup>2</sup>



## Introduction

- The SARS-CoV-2 coronavirus has resulted in a global pandemic and the loss of over 3.5 million lives. Cardiovascular involvement has been described as a significant cause of morbidity and mortality in COVID-19 patients, with early studies focused on the role myocarditis in the pathogenesis.
- Early descriptions of viral myocarditis in hospitalized and even patients that had recovered from COVID-19 were derived from clinical, radiological, and laboratory measurements, rather than tissue diagnosis.
- There have been several autopsy case series that have documented varying histopathologic changes, including what is considered viral myocarditis. While there are differences in what is considered myocarditis in the published reports, the largest autopsy series published to date indicates that the overall rate of lymphocytic myocarditis is low (<2%).
- Growing concern regarding the reported occurrence of cardiac symptoms in this patient population emphasizes the importance in determining whether subtle changes in COVID-19 hearts may yield important clues to susceptibility to long term cardiac consequences.

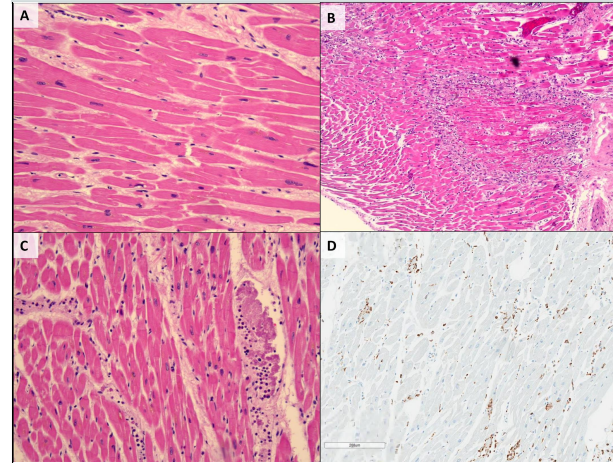
## Methods

- We identified 10 non-consecutive decedents whose death was due to COVID-19 infection.
- A control group of 10 decedents (5 male and 5 female) was selected, all of whom had pre-mortem diagnosis of HTN, DM2, and CKD and had died and had an autopsy performed during the same period.
- The myocarditis control group consisted of 5 patients with a confirmed diagnosis of myocarditis who had an autopsy during the years 2015-2020.
- The COVID-19 and control groups were compared for age, BMI, percentage of coronary artery stenosis as well as serum troponin, d-dimer, and BNP levels. Some demographic and laboratory data was not available for each included decedent.

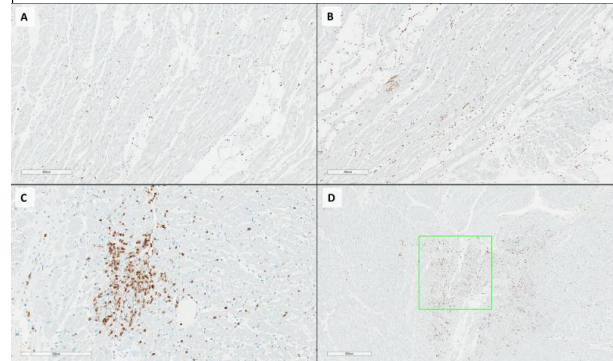
## Demographic/Histopathologic Findings

COVID-19	Control	Myocarditis	
<b>Study Characteristic</b>			
Gender (M/F)	5/5	5/5	3/2 (one not known)
Age (mean; range)	64 (49-79)	56 (30-79)	49 (30-59)
BMI (mean; range)	33 (22-45)	32 (17-45)	Not recorded
Race (AA/Caucasian/Hispanic)	6/3/1	9/1/0	3/1/7
Known Heart Disease (incl. Afib)	3	0	Not recorded
Hypertension	8	10	Not recorded
Type 2 Diabetes	4	10	Not recorded
Renal disease	2	10	Not recorded
Cancer	1	0	Not recorded
Obesity (BMI>30)	4	4	Not recorded
Coronary stenosis (maximal lesion any vessel) (mean; range)	22% (0-75%)	18% (0-75%)	Not recorded
<b>Laboratory Parameter</b>			
Elevated Troponin I nI<0.04	6/10	2/10	3/4
Elevated BNP (pg/mL) nI<100	6/10	5/8	2/2
Elevated D-dimer (ng/mL DDU) nI<250	8/8	4/4	2/2

## Histopathologic Images

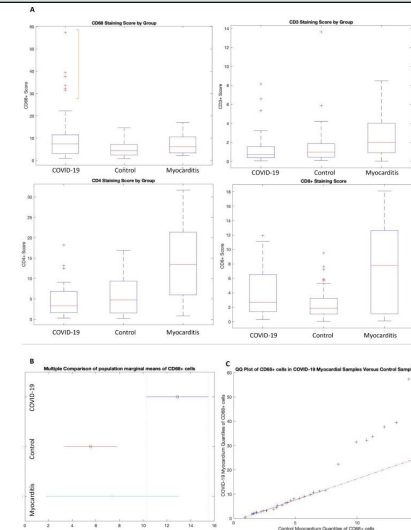


(A) Cardiac myocytes from control patient (H&E). (B) Myocarditis, characterized by patchy, dense inflammation within the myocardium (H&E). (C) Endothelitis and diffuse, perivascular distribution of inflammation in COVID-19. (D) CD68 immunostaining highlighting the presence of CD68+ cells in a mild, diffuse intravascular and perivascular distribution in a case of COVID-19.



(A) CD3 immunostaining, demonstrating a paucity of CD3+ lymphocytes in COVID-19. (B) CD68 immunostaining in COVID-19, highlighting a mild, diffuse distribution of CD68+ cells. (C) CD3 immunostaining in a case of myocarditis, demonstrating intense staining for CD3+ lymphocytes in a patchy distribution. (D) CD68 immunostaining in myocarditis, in a similar patchy distribution to that of lymphocytes, with example of region selection box for analysis.

## Analyses



(A) Boxplots showing median and range of CD68, CD3, CD4, and CD8 staining cells for each Patient Group. A red bracket highlights the numerous outliers of CD68+ cells in the upper quantile of the COVID-19 group, which may represent a subset of COVID-19 patients with greater myocardial inflammation. (B) Population marginal means after correction for multiple comparisons within the nested ANOVA performed on CD68+ cells. The population marginal mean of CD68+ cells is significantly higher for the COVID-19 group as compared to controls. (C) Q-Q plot of CD68+ cell quantiles in the COVID-19 myocardium samples as compared to control quantiles. The relationship is non-linear at higher quantiles, indicating a difference in distribution of CD68 positivity among the COVID-19 group, with higher values at the upper quantiles

## Conclusions

- There was a skewed distribution of the number of CD68+ cells in COVID-19 hearts, with upper quantiles showing a significant increase as compared to both matched control hearts, and those with myocarditis.
- In contrast, hearts from typical inflammatory myocarditis contained increased numbers of CD4+, and CD8+ cells compared to both COVID-19 and control cohorts.
- The presence of an increased number of CD68+ cells suggests that COVID-19 may incite a form of myocarditis different from typical viral myocarditis associated with diffusely infiltrative cells of monocytes/macrophage lineage.
- Monocyte infiltration can lead to endothelial injury in the heart, leading to clotting at the arteriole, venule and capillary level, initiating thrombosis and resulting ischemia/reperfusion injury.
- Alternatively, the presence of endothelial injury could attract non-classical monocytes (i.e., M1) to the site resulting in macrophage-induced activation of the complement pathway and generating apoptotic injury.
- Whether one of these proposed pathways is more important and/or which local conditions lead to primary activation of one or the other pathway is the subject of our ongoing investigations.

# A Tale of Two Sisters: Two Pediatric Cases within a Familial Cluster of Hereditary Diffuse Gastric Carcinoma

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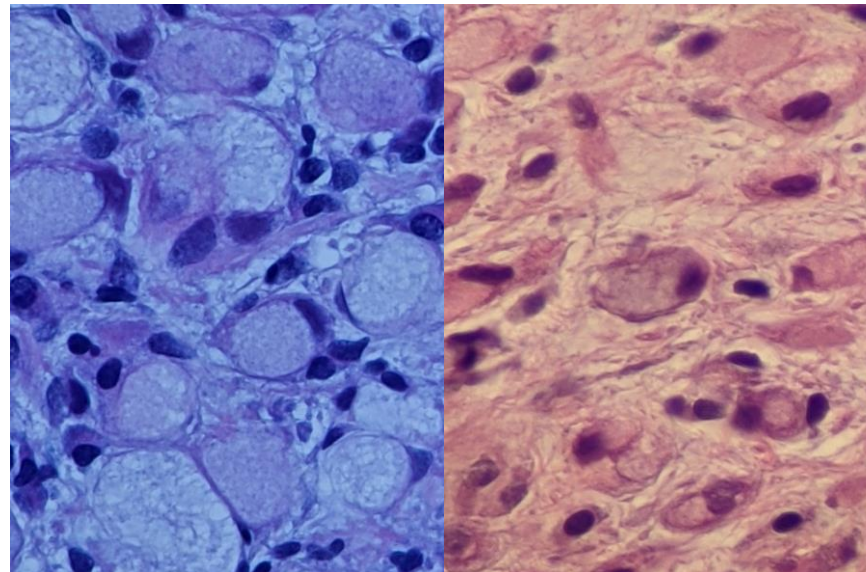
## Background

- Hereditary Diffuse Gastric Cancer (HDGC) is a familial form of poorly differentiated signet ring cell carcinoma (SRCC)
- Caused by an autosomal dominant mutation in the CDH1/E-cadherin gene mediating cell adhesion
- Early stages of SRCC can be exceptionally difficult to diagnose as there are characteristically widespread submucosal foci
- Carriers are advised to undergo prophylactic gastrectomy due to the high mortality associated with invasive HDGC
- Carriers also have an increased risk of lobular breast carcinoma and possibly colorectal adenocarcinoma.

## Case

- A 15 year old female with no significant past medical history presents to clinic with a 4-month history of generalized abdominal pain with no specific aggravating/relieving factors.
- Family history was significant for a paternal great-aunt who reportedly died from gastric cancer at age 28 and her mother who has irritable bowel syndrome
- EGD revealed a normal appearing esophagus, the entire stomach revealed diffuse mild inflammation with normal appearing rugae without ulceration or masses and normal proximal duodenum.
- Biopsy of the antrum revealed poorly differentiated signet ring cell carcinoma.
- The patient subsequently underwent a therapeutic and curative laparoscopic roux-en-Y esophagojejunostomy, jejunojunostomy with exploratory laparoscopy.
- Based upon the unusual occurrence of SRCC in a young female, the patient and her family underwent genetic testing, revealing a mutation in the CDH1/E-cadherin gene in the patient, her 10-year-old sister, and the father.
- Screening EGD in the 10-year old sister and the father also revealed SRCC confined to the lamina propria.

## Images



*Biopsy from gastric antrum demonstrating submucosal poorly differentiated signet ring cell carcinoma.*

## Discussion

- Gastric carcinoma primarily affects patients between the ages of 50 and 70 years of age and is uncommon before the 5<sup>th</sup> decade of life.
- Early-onset gastric cancer (EOGC) is defined as gastric cancer occurring at the age of 45 years old or younger.
- Hereditary diffuse gastric carcinoma accounts for 1-3% of gastric cancers with less than 10% of those cases under the age of 45.
- Gastric carcinoma is exceedingly rare in the pediatric population, which may lead to delayed diagnosis.
- HDGC should be considered when a patient presents with gastrointestinal symptoms and has a positive family history of gastric cancer among 1<sup>st</sup> and 2<sup>nd</sup> degree relatives, particularly if a relative was diagnosed before the age of 50.
- HDGC may exhibit indolence for decades even after invading the lamina propria. The molecular mechanisms that initiate the transition from indolent to invasive behavior are unknown and require more research.
- Early identification and treatment of gastric signet-ring cell carcinoma is imperative for a more favorable prognosis.

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# An Exploratory Analysis on Joint Bleeds in Patients with Hemophilia A and Inhibitors: Adults vs Pediatrics

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## Introduction

- ❖ Blood-induced joint disease is a key feature of hemophilia and remains among the most common complications and concerns for physicians and patients.
- ❖ Prophylactic factor replacement with recombinant FVIII is the standard of care for treatment of hemophilia A.
- ❖ Roughly 20-30% of patients with severe hemophilia A develop inhibitors to factor replacement, requiring more frequent hospitalizations due to bleeding and a reduced quality of life.
- ❖ Patients with increased levels of inhibitors known as a high-titer state are at risk of even more severe outcomes, resulting in advanced hemarthropathy causing physical disability.
- ❖ Bypassing agents such as FEIBA are used to achieve hemostasis in the presence of inhibitors

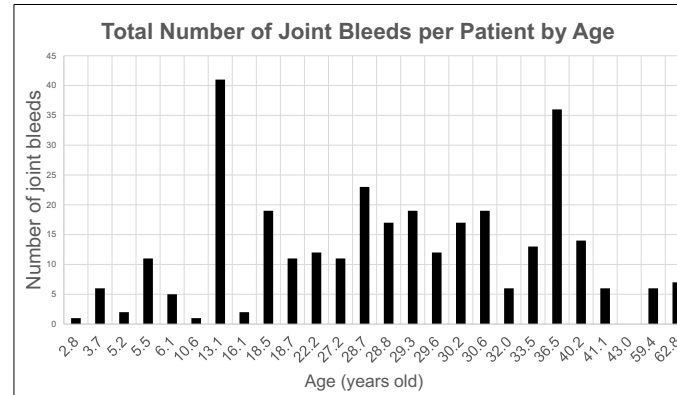
## Aim

- ❖ This exploratory analysis focuses on the on-demand treatment of joint bleeds with FEIBA in a group of patients followed for 6 months.
- ❖ We evaluated potential differences in joint bleeds between adult and pediatric patients. We believe this exploratory analysis may offer up additional questions and insights surrounding the very nature of bleeding in patients with hemophilia A and inhibitors.

## Methods

- ❖ Using data from an investigator-initiated, prospective, crossover clinical trial, we evaluated differences in bleed events between the adult and pediatric patients from a 6 month on-demand treatment period

## Data



**Figure 1.** Total number of joint bleeds per patient during the 6-month analysis period by age. Age is graphed sequentially on the x-axis in increasing order. The number of joint bleeds per patient on the y-axis.

	Pediatric (n=8)	Adults (n=18)
AVG Age (years old)	5.82	34.01
AVG Weight (kg)	27.54	75.53
AVG Effective Dose of FIEBA (U/kg) used for joint bleeds	85.56	75.42
AVG Total Joint Bleeds	8.63	13.78
AVG Dose of Factor used for joint bleeds	2337.31	5749.23
AVG Dose of Factor used for target joint bleed	2758.44 (n=3)	5822.41
AVG infusions per joint bleed event	3.68	2.59
AVG infusion per target joint bleed	5.478 (n=3)	2.38
AVG duration of treatment per joint bleed event (hr)	68.78	80.16
AVG duration of treatment per target joint bleed event (hr)	144 (n=3)	56.09
AVG # of target joint per patient	2.33 (n=3)	2.06
# Target Joint Bleeds	15.67	11.36

**Table 1.** Side-by-side comparison of joint bleed data collected on pediatric and adult patients from the Pro-FIEBA study

	Pediatric (n=8)	Adults (n=18)
RS	1.0	3.3
LS	1.0	1.6
RE	5.5	2.7
LE	2.5	2.2
RH		1.5
LH		
RK	5.2	4.9
LK	2.0	3.4
RA	1.3	4.6
LA	4.0	3.9
RW	1.0	1.4
LW		1.4
Other	2.0	2.0

	Pediatric (n=8)	Adults (n=18)
RS	2 (25%)	4 (22%)
LS	2 (25%)	5 (22%)
RE	2 (25%)	11 (61%)
LE	2 (25%)	11 (61%)
RH	0	2 (11%)
LH	0	0
RK	5 (63%)	8 (44%)
LK	4 (50%)	9 (50%)
RA	3 (38%)	10 (56%)
LA	2 (25%)	7 (39%)
RW	1 (13%)	5 (28%)
LW	0	5 (28%)
Other	1 (13%)	5 (28%)

**Table 2.** Average number of joint bleeds by location per group (left).

**Table 3.** Number of patients with at least 1 joint bleed (right).

## Results and Conclusions

- ❖ Our retrospective data analysis showed, on average, pediatric patients used more infusions per joint bleed, but took less time (~14%) to resolve the bleed. In addition, pediatric patients had fewer average total number of joint bleeds per patient during the 6-month analysis period (8.63 vs 13.78).
- ❖ Research comparing bleed data between adult and pediatric patients with hemophilia and high-titer inhibitors is limited. Our pre-liminary data analysis suggests potential differences in how the two age groups heal following acute joint hemorrhage.

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# Case Report of a Pediatric Undifferentiated Pleomorphic Sarcoma of the Cecum

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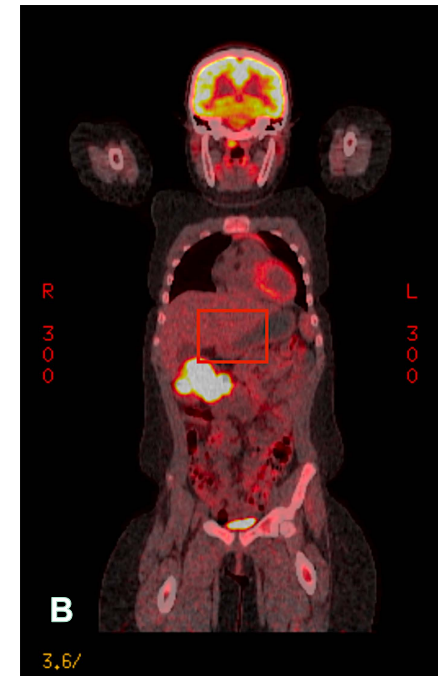
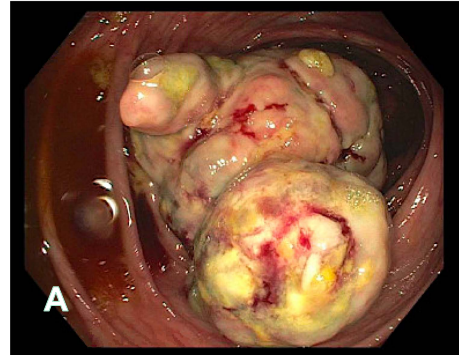
## Introduction

- ❖ Undifferentiated pleomorphic sarcoma (UPS) is a high-grade pleomorphic neoplasm without any definable line of differentiation.
- ❖ UPS is typically diagnosed in older adults and localized to the extremities or retroperitoneum, with primary tumors of gastrointestinal tract being uncommon.
- ❖ Only two other cases of pediatric UPS located in the intestinal tract have been reported.
- ❖ UPS has no reproducible immunophenotype or pattern of protein expression that allows for further classification of the tumor and exclusion of pleomorphic variants of other neoplastic lines is required.
- ❖ Standard treatment is early complete surgical resection.
- ❖ The role of chemotherapy and radiation is debated and without strong evidence.

## Case Presentation

- ❖ A 12-year-old African American female presented to clinic due to one week of nausea and vomiting.
- ❖ She reported fatigue and chronic intermittent cramping abdominal pain for four months with unintentional weight loss of 25 pounds.
- ❖ On exam she had pale conjunctiva and was tachycardic.
- ❖ CBC revealed anemia: hemoglobin 7.3 g/dL (nL: 12.0–16.0), hematocrit 29.7% (nL: 36.0–46.0), mean corpuscular volume 62 fL (nL: 78.0–98.0), red cell distribution width 18.9% (nL: 11.5–14.5) and platelets 708 K/uL (nL: 150–450).
- ❖ Serum iron was 10 ug/dL (nL: 30–160), TIBC 304 ug/dL (nL: 265–497), iron saturation 3% (nL: 20–50) and ferritin 5 ng/mL (nL: 16.0–300.0).
- ❖ Patient had a positive fecal occult blood test, suggesting iron-deficiency anemia due to chronic intestinal blood loss.
- ❖ C-reactive protein was elevated at 3.01 mg/dL (nL: 0.0–0.9)
- ❖ From the initial workup, inflammatory bowel disease and NSAID-induced gastritis were on the list of differentials.
- ❖ Upper gastrointestinal (GIT) endoscopy showed no abnormalities.
- ❖ Colonoscopy showed a large, fungating, non-obstructing, 7-cm cecal mass (Figure A), with remainder of colon normal.
- ❖ Biopsy of mass was consistent with UPS with tumor cells weakly positive for SATB2.

## Images



## Hospital Course

- ❖ CT of abdomen and pelvis noted a cecal mass and multiple enlarged pericolic and mesenteric lymph nodes.
- ❖ CT chest with contrast revealed a 1.1-cm solid, noncalcified subpleural nodule in posterior inferior left lower lobe (LLL).
- ❖ PET scan showed positive uptake in right colon mass with possible uptake in the mediastinum and LLL (Figure B).
- ❖ A formal right hemicolectomy was performed and an intraluminal cecal mass was noted to be causing colo-colonic intussusception; the ileal and colon margins were negative for malignancy and 39 regional lymph nodes were negative.
- ❖ Video-assisted thoracoscopic surgery and wedge resection of pulmonary nodule was completed and showed findings consistent with Histoplasma capsulatum, for which the patient completed a six-month course of itraconazole.
- ❖ Two-month follow-up MRI showed no evidence of disease.

## Discussion

- ❖ UPS is a diagnosis of exclusion reserved for sarcomas with a distinct combination of immunohistochemical and microscopic features, made only after careful consideration of other diagnoses.
- ❖ Prognosis for UPS is generally poor because of regional invasiveness, distant metastases and frequent recurrence.
- ❖ This case is unique both for being localized to the GIT tract, with only 14 cases reported of cecal or ascending colon UPS, as well as the young age of the patient, with only 2 other cases of pediatric GIT UPS reported.
- ❖ Chemotherapy was not given in this case as the tumor was resected with clear margins and no lymph node involvement.
- ❖ Additional research into the role of radiation and chemotherapy for abdominal UPS is needed, especially in cases where surgical resection is not possible.
- ❖ Continued monitoring and close follow-up are essential to good long-term outcomes due to a relatively high recurrence rate.

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# Investigating the role of GSK3- $\beta$ in poxvirus infection

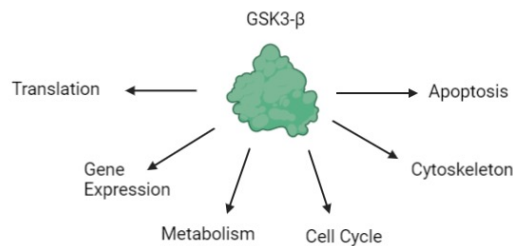
Areef R, Morales E, Narla S, Willis M, Ortega M, Stansbury N, and Stephen DiGiuseppe

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## Background and Significance

Poxviruses cause significant morbidity and mortality throughout our history. Notably, smallpox was eradicated, but new poxviruses are still being discovered and emerging zoonotic poxviruses such as the monkeypox are a public health concern. Currently, there has been ongoing outbreak of monkeypox in Nigeria since 2017. In 2020, two travel-associated cases of monkeypox spilled over into the United States in Texas and Maryland in 2020. Experts are concerned that it is only a matter of time before future outbreaks occur. Currently, we don't have any specific treatment options for emerging zoonotic poxviruses. Therefore, we study the poxvirus life cycle to identify novel therapeutic targets that can interfere with poxvirus infection.

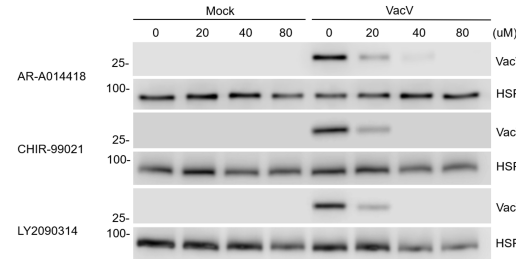
Poxviruses are incredibly self-sufficient and replicate solely in the cytoplasm of infected cells. During infection, poxviruses must co-opt the host's translation machinery to translate viral mRNAs. How poxvirus hijack's the host's translational machinery is not well understood leaving a considerable gap in our understanding of this very critical process. A recent report from suggests that there are 140 inhibitors to Vaccinia virus (prototypic poxvirus used in research), one of which is Glycogen Synthase Kinase 3-Beta (GSK3- $\beta$ ). **GSK3- $\beta$  is a regulatory kinase involved in a variety of cellular pathways such as glycogen synthesis, host translation, cell migration, innate immune response, and cell growth.** Inhibition of GSK3- $\beta$  suppressed infection of Vaccinia virus (VacV), a prototypic poxvirus. Since GSK3- $\beta$  is known to play a regulatory role in upstream signaling of host translation it may be utilized by poxvirus to facilitate viral translation during infection.



## Central Hypothesis

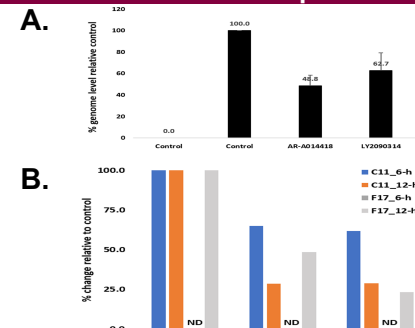
We hypothesize that GSK3- $\beta$  promotes poxvirus infection by positively regulating the upstream signaling of the host's translational machinery.

## Inhibition of GSK3- $\beta$ reduces poxvirus protein accumulation



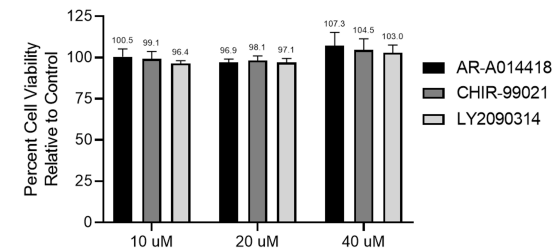
**Figure 1. Western blot analysis of viral protein levels following inhibition of GSK3- $\beta$ .** Normal Human Dermal Fibroblasts (NHDFs) were pretreated with increasing amounts of AR-A014418, CHIR-99021, or LY2090314 for 1 hour at 37 °C then infected with Vaccinia virus (VacV) at a multiplicity of infection (MOI) of 5 for 24 hours. At 24 hours post infection (hpi), lysate was collected, and viral protein (VacV-D8) was analyzed by Western blot analysis. Note HSP90 is a cellular loading control.

## Inhibition of GSK3- $\beta$ reduces poxvirus DNA and transcript levels



**Figure 2. Quantitative PCR analysis of viral DNA and transcript levels following inhibition of GSK3- $\beta$ .** NHDFs were pretreated with increasing amounts of AR-A014418, CHIR-99021, or LY2090314 for 1 hour at 37 °C. Cells were infected with VacV at MOI 5 for 24 hours. At 24 hpi, total DNA and RNA was isolated using Qaigen DNA extraction kit or TRIzol extraction, respectively. The viral J2 gene was amplified by quantitative PCR (qPCR) and normalized relative to Actin gene. C11 (early) and F17 (late) transcripts were amplified by reverse transcriptase (RT)-qPCR normalized relative to Actin transcript.

## Inhibition of GSK3- $\beta$ does not change cell viability after 48 hours



**Figure 3. Cell viability assay to measure cell viability after inhibition of GSK3- $\beta$ .** NHDFs were treated with increasing amounts of AR-A014418, CHIR-99021, or LY2090314 for 1 hour at 37 °C for 24 and 48 hours. At 24- and 48-hours post treatment (hpx), live cells were incubated with cell viability reagent for 4 hours and the absorbance was measured.

## Overall Conclusions

- Inhibition of GSK3- $\beta$  reduces poxvirus protein accumulation.
- Inhibition of GSK3- $\beta$  reduces viral DNA and transcript levels.
- Inhibition of GSK3- $\beta$  does not change cell viability after 48 hours

## Future Directions

- Test whether inhibition of GSK3- $\beta$  reduces viral infectivity via plaque assay.
- Test whether Inhibition of GSK3- $\beta$  affects nascent protein synthesis
- Determine how inhibition of GSK3- $\beta$  reduces viral protein accumulation. Which pathways are affected?

# Adequacy of Advance Directives in Patients Admitted to the Intensive Care Unit



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## Background

- End-of-life care decision making is a vital component of treatment and long-term management for patients admitted to the intensive care unit (ICU)
- Documents such as an Advance Directive (AD) and selection of a Power of Attorney (POA) can help guide patients, families, and physicians in providing goal oriented and timely care reducing healthcare costs
- Studies show rate of having an AD and/or POA ranged between 55% and 60%
- Having an AD does not mean it will be followed
- Limited studies regarding adherence and specificity of ADs and POAs in the ICU setting

## Objectives

- Measure the percentage of patients admitted to the ICU who have an AD or POA
- Determine if ICU patients have an AD or POA that outlines their specific wishes regarding end-of-life care or care when they are unable to make decisions
- Determine whether those patients with an AD or POA received health care that aligned with wishes
- Conclude if having an AD or POA limits the number of futile procedures that patients receive

## Methods

- Retrospective chart review of 2,363 patients admitted to University Medical Center of New Orleans
- Inclusion criteria:
  - ≥ 18 years old
  - ICU admissions between August 2015 and March 2019
- Data collected:
  - Patient characteristics
  - Presence, format, and specificity of AD and/or POA
  - Treatments delivered (life support measures, escalation events, palliative care)
- Statistical analysis:
  - ADs and patient characteristics were analyzed using Firth's logistic regression
  - POAs and patient characteristics were analyzed using logistic regression modeling

## Demographics

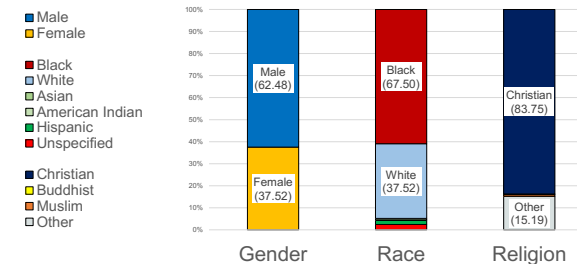


Figure 1: demographic breakdown (percentages of total patient population)

## Frequency and Specificity

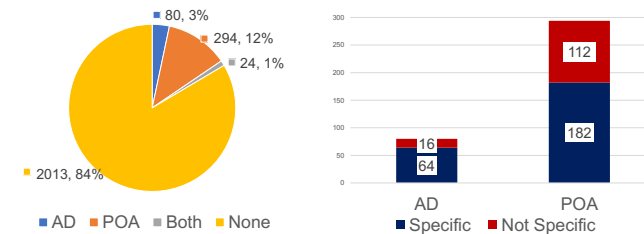


Figure 2: frequency of AD or POA

Figure 3: specificity of AD or POA

## Advance Directive

Variable	OR	95% CI		p-value*
Age	1.061	1.043	1.080	<0.0001*
Gender				
Male vs Female	0.707	0.446	1.122	0.1415
Race				
Non-Hispanic Black vs Other	1.943	0.360	10.489	0.4402
Non-Hispanic White vs Other	1.807	0.321	10.180	0.5022
Asian vs Other	1.009	0.039	26.118	0.9957
American Indian vs Other	4.650	0.118	182.643	0.4119
Hispanic vs Other	2.387	0.283	20.116	0.4238
Religion				
Christian vs Other	1.498	0.697	3.217	0.3004
Buddhist vs Other	3.425	0.135	86.582	0.4551
Muslim vs Other	6.960	1.038	46.661	0.0457*

Table 1: association between variables and having an Advance Directive

## Power of Attorney

Variable	OR	95% CI	p-value*	
Age	1.041	1.031	1.051	<0.0001
Gender	1.042	0.803	1.351	0.7586
Male vs Female				
Race				
Non-Hispanic Black vs Other	0.828	0.407	1.685	0.6033
Non-Hispanic White vs Other	0.770	0.369	1.606	0.4856
Asian vs Other	1.114	0.225	5.520	0.8952
American Indian vs Other	1.215	0.117	12.593	0.8702
Hispanic vs Other	0.209	0.043	1.024	0.0535
Religion				
Christian vs Other	1.324	0.900	1.948	0.1535
Buddhist vs Other	2.082	0.310	13.959	0.4502
Muslim vs Other	0.474	0.058	3.858	0.4850

Table 2: association between variables and having a POA

## Alignment of Care

	Life Support	Escalation Events	Palliative Care
AD	79.63% (n=80)	65.63% (n=80)	50% (n=80)
POA	70.97% (n=294)	35.71% (n=294)	48.20% (n=294)
Overall Directive	73.82% (n=350)	37.62% (n=350)	48.57% (n=350)

Table 3: percentage of patients who received care that aligned with their wishes as stated in an AD or by a POA

## Conclusions

- 13.75% (n=80) of patients with an AD received some combination of futile procedures and that percentage increased to 46.60% (n=294) among patients with a POA
- Overall, among patients with some form of directive, 41.43% of patients received some futile procedures (n=350)
- Educational programs that target AD and POA planning prior to ICU admission would be beneficial since the presence of a POA often led to care that did not align with patient's wishes and increased futile procedures
- Recommend additional emphasis on end-of-life care counseling
- Intervention targeted at younger individuals in the emergency department would help improve AD completion and POA delegation



# Clinical Management of Missed Bowel Injuries in Blunt and Penetrating Abdominal Trauma

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## Introduction

- The occurrence of a **bowel injury following abdominal trauma** is rare, but **missed diagnoses and delayed treatment** are associated with increased morbidity and mortality.
- Bowel injuries require immediate operative intervention to avoid complications such as:
  - Infections/sepsis
  - Enterocutaneous fistulas
  - Massive bleeding
  - Prolonged hospital length of stay
  - Repeat surgery
  - Mortality
- Traumatic bowel injuries can be diagnosed via computed tomography (CT), exploratory laparotomy, or diagnostic laparoscopy, and surgical decision-making is based on a combination of the patient's imaging and clinical presentation.
- Current **surgical decision-making guidelines** for managing patients with a possible bowel injury following abdominal trauma are variable and clinical expertise is limited due to the relative infrequency of these injuries.

### AIM:

Refine a decision-making algorithm for the management of patients with penetrating and blunt abdominal trauma in order to decrease delayed and missed diagnoses of bowel injuries and thus minimize associated morbidity and mortality.

## Methods & Results

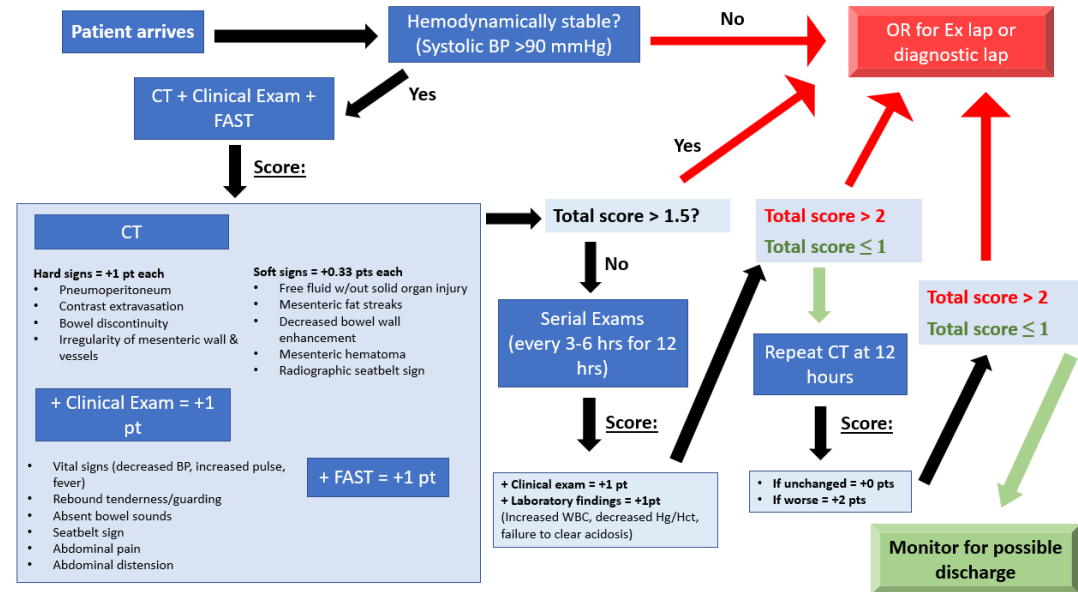
- Phase 1 & 2:** Retrospective chart review + literature review to determine study criteria
  - Delayed diagnosis: 4-24 hours after admission
  - Missed diagnosis: >24 hours after admission

Patient	Blunt Trauma	Penetrating Trauma	Hours to Diagnosis
1	X		151
2	X		41
3	X		187
4	X		11
5		X	18
6	X		96
7		X	16
8	X		13
9		X	4.5
10	X		25
11	X		10
12	X		4
13		X	17
14	X		36

**Table 1:** Retrospective results of 122 patient charts from July 2012 through Dec. 2021 at UMCNO that presented with blunt or penetrating abdominal trauma and a resulting bowel injury detailing time to diagnosis of bowel injury.

- Phase 3: Refine algorithm**
  - Utilized "point system" to determine next best steps in treatment for patients without an apparent immediate need for surgical intervention
  - Combination of CT "hard signs" and "soft signs" used in the context of the patient's clinical picture to determine if surgery is warranted
- Phase 4: Implementation**
  - Decision-making algorithm (Fig. 1) will be implemented at UMCNO for at least 1 year to determine efficiency & efficacy of protocol

## Algorithm



**Fig. 1:** Proposed treatment decision-making algorithm for blunt & penetrating abdominal trauma patients to be implemented at UMCNO.

## Discussion

Of the 122 abdominal trauma patients with resulting bowel injury that presented to the UMC New Orleans Department of Trauma Surgery between July 2012 and December 2021, 8 were identified by this study as having a delayed diagnosis, and 6 patients were identified as having a missed diagnosis. These instances were a result of inadequate surgical decision-making protocols for traumatic abdominal injuries, and many of them resulted in unnecessary complications and increased hospital length of stays.

A decision-making protocol was created (Fig. 1) following a thorough review of similar previously published algorithms and our retrospective chart review data in Table 1. The scoring method of our proposed algorithm would have decreased the time to diagnosis of these bowel injuries, thus minimizing related complications. This refined algorithm will be implemented in Phase 4 of the study for blunt and penetrating abdominal trauma patients presenting to UMC New Orleans so that the efficiency and efficacy of this algorithm can be assessed for permanent implementation.

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# Factors Affecting Outpatient Physical Therapy Attendance Following Total Knee Arthroplasty



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## Introduction

**INTRODUCTION:** Total knee arthroplasty (TKA) is an elective procedure aimed at restoring functionality and improving quality of life for patients who suffer from severe knee pain and limitation. Following TKA, physical therapy (PT) is universally recommended to optimize function, strength, and range of motion (ROM). It is important to identify what patient factors predict engagement in and completion of a full course of PT. The goal of this study is to identify what patient factors predict engagement in and completion of a full course of PT defined as  $\geq 2$  sessions attended and  $\geq 16$  sessions attended, respectively.

**METHODS:** 270 patients who had undergone single-knee primary TKA at an urban academic private hospital by the same operating physician between January 2016 through December 2019 were selected for this study. Patient demographic data were analyzed in comparison to the number of PT sessions completed by patients. The number of appointments completed by each patient was determined by reviewing signed PT notes. Distance to clinic was calculated in kilometers using the shortest route from the patient's home address to the clinic on Google Maps. For patients who performed PT outside affiliated clinics, a second search was performed using a different electronic medical record system. The number of PT appointments attended and the duration of time over which these appointments took place were analyzed with the demographic factors below to search for correlations with adherence to PT post-TKA. Patients were stratified into categories of adherence (engagement and completion) based on the number of sessions attended.

Table 1. Patient characteristics (n=270)	All	Patient with ONLY Ochsner PT (n=219)
Characteristic not collected on all patients		
Sex, % (n)		
Female	67.4 (182)	68.0 (149)
Male	32.6 (88)	32.0 (70)
Age, % (n)		
<65 years	25.9 (70)	25.1 (55)
$\geq 65$ to <75 years	49.6 (134)	50.2 (110)
$\geq 75$ years	24.5 (66)	24.7 (54)
Race, % (n)		
Black	38.9 (105)	37.4 (82)
White	56.3 (152)	57.1 (125)
Other	4.8 (13)	5.5 (12)
Body mass index, % (n)		
<25 kg/m <sup>2</sup>	7.0 (19)	6.8 (15)
$\geq 25$ to <30 kg/m <sup>2</sup>	29.6 (80)	29.7 (65)
$\geq 30$ to <35 kg/m <sup>2</sup>	31.1 (84)	30.6 (67)
$\geq 35$ kg/m <sup>2</sup>	32.2 (87)	32.9 (72)
Education, % (n) <sup>1</sup>		
< High school	14.3 (34)	15.0 (29)
High school graduate	29.8 (71)	29.5 (57)
> High school	55.9 (133)	55.5 (107)
Partner, % (n) <sup>1</sup>	48.7 (129)	49.1 (105)
Insurance type, % (n)		
Private	35.6 (96)	35.6 (78)
Medicare	23.7 (64)	25.1 (55)
Medicare Advantage	34.8 (96)	32.9 (72)
Medicaid	3.7 (10)	4.1 (9)
Other	2.2 (6)	2.3 (5)
Laterality, % (n)		
Right	50.7 (137)	50.7 (111)
Left	49.3 (133)	49.3 (108)
Kellian Laurence grade, % (n) <sup>1</sup>		
0	0 (0)	0 (0)
1	0 (0)	0 (0)
2	0.8 (2)	0.9 (2)
3	7.8 (21)	7.8 (17)
4	91.4 (245)	91.3 (199)
Second surgery		
No 2 <sup>nd</sup> surgery	80.4 (217)	80.4 (176)
2 <sup>nd</sup> surgery < 6 months	5.6 (15)	5.9 (13)
2 <sup>nd</sup> surgery > 6 months	14.0 (38)	13.7 (30)
Distance from PT office, % (n) <sup>1</sup>		
<40 km	86.3 (226)	91.6 (195)
$\geq 40$ km	13.7 (36)	8.4 (18)

Table 2. Univariate predictors of completing PT after TKA.		PT ≥ 2 (n=270)		PT ≥ 16 (n=219)	
*Characteristic not collected on all patients					
	% (n)	P value	% (n)	P value	
Sex		0.819		0.528	
Male	87.5 (77)		73.2 (109)		
Female	88.5 (161)		77.1 (54)		
Age, years		0.464		0.929	
<65	84.3 (59)		76.4 (42)		
≥65 to <75	88.8 (119)		73.6 (81)		
≥75	90.9 (60)		74.1 (40)		
Race		0.550		0.036	
White	87.5 (133)		80.8 (101)		
Black	87.6 (92)		67.1 (55)		
Other	100 (13)		58.3 (12)		
Body mass index, kg/m <sup>2</sup>		0.770		0.618	
<25	88.5 (17)		60.0 (9)		
≥25 to <30	87.5 (70)		75.4 (49)		
≥30 to <35	85.7 (72)		76.1 (51)		
≥35	90.8 (79)		75.0 (54)		
Education <sup>1</sup>		0.823		0.477	
< High school	91.2 (31)		69.0 (20)		
High school graduate	88.7 (63)		80.7 (46)		
> High school	86.5 (115)		76.6 (82)		
Partner <sup>1</sup>		0.592		0.271	
No	89.0 (121)		71.6 (78)		
Yes	86.8 (112)		78.1 (82)		
Insurance type		0.500		0.454	
Private	87.5 (84)		79.5 (62)		
Medicare	92.2 (59)		70.9 (39)		
Medicare Advantage	85.1 (80)		66.7 (6)		
Medicaid	100 (10)		70.8 (51)		
Other	83.3 (6)		100 (5)		
Laterality, % (n)		0.774		0.849	
Right	87.6 (120)		73.9 (82)		
Left	88.7 (118)		75.0 (81)		
Kellian Laurence grade, % (n) <sup>1</sup>		0.597		0.031	
2	100 (2)		0 (0)		
3	95.2 (20)		88.2 (15)		
4	87.8 (215)		74.4 (148)		
Second surgery		0.606		0.537	
No 2 <sup>nd</sup> surgery	88.9 (193)		75.0 (132)		
2 <sup>nd</sup> surgery < 6 months	86.7 (13)		61.5 (8)		
2 <sup>nd</sup> surgery > 6 months	84.2 (32)		76.7 (23)		
Distance from PT office, % (n) <sup>1</sup>		<0.0001		1.000	
<40 km	92.0 (208)		74.4 (145)		
≥40 km	66.7 (24)		72.2 (13)		

## Distance effect on PT engagement

Distance from PT office	Rate (95% CI)
<20 km	93.1% (87.5, 96.2)
$\geq 20$ to <40 km	90.2% (81.6, 95.1)
$\geq 40$ to <60 km	71.4% (32.5, 92.9)
$\geq 60$ to <80 km	71.4% (32.5, 92.9)
$\geq 80$ to <100 km	66.7% (33.2, 89.0)
$\geq 100$ km	61.5% (34.2, 83.1)

**Table 2A.** Physical therapy (PT) attendance of two or more visits within the system after TKA (n=239).  
CI = confidence interval; TKA = total knee arthroplasty.

The overall distance effect was  
p=0.008

## Results

- Analysis showed that increasing distance to clinic negatively impacted engagement with PT (p= 0.008). 92.0% (208) individuals residing within 40 km engaged in PT, whereas 66.7% (24) of individuals residing greater than 40 km from PT office engaged in PT (p = <0.0001).
- This association was not seen when analyzing PT completion (p = 1.000).
- There was a significant association between completion of PT and race (p = 0.036). White patients (101, 80.8%) were more likely to complete PT when compared to black (55, 67.1%) or other (12, 58.3%) patients.
- Higher Kellian Laurence Grade preoperatively was associated with a decrease in patients completing PT (p = 0.031)

## Discussion

- PT clinic referral pre-operatively may be an important predictor of creating patient engagement, especially among patients residing >40 km from PT facility.
- Lack of significance between distance and completion of PT further emphasizes the importance of pre-operative planning for rehabilitation
  - Patients living in rural areas are caught between wanting access to the best resources vs seeking more local care and being more likely to engage in their care
- Kellian Laurence grade could be used to screen for patients needing extra follow up to complete PT
- Further investigation into why black patients were less likely to complete PT is needed as it is likely a complex issue based on multiple social determinants of health
  - Physicians and physical therapists can use this observation to tailor care to patients of different racial backgrounds, dedicating more time and planning to patients who may be more likely to not complete their care



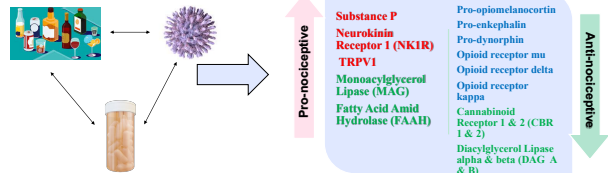
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## Introduction

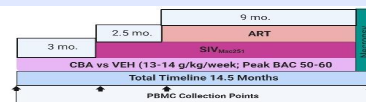
- People living with HIV (PLWH) have a 2-fold higher prevalence of chronic pain compared to the general population.
- Chronic alcohol use (present in greater frequency in PLWH) HIV infection, and anti-retroviral therapy (ART) all independently lead to altered pain states, yet the underlying pathophysiology is poorly understood.
- Peripheral blood mononuclear cell (PBMC) gene expression is used as surrogate markers for altered states of inflammation and nociception in diseases such as IBS, Cardiac Syndrome X, and polyneuropathy.
- This study investigated the gene expression profile of endocannabinoid, opioid, and neurokinin receptor systems in PBMCs as possible indicators of altered nociceptive pathways.

## Hypothesis

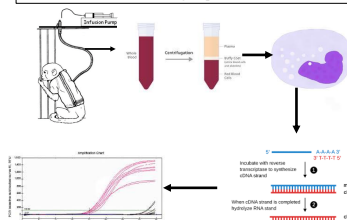


Chronic binge alcohol increases expression of pro-nociceptive and decreases expression of anti-nociceptive genes within peripheral mononuclear cells in the context of SIV/ART exposure.

## Materials and Methods

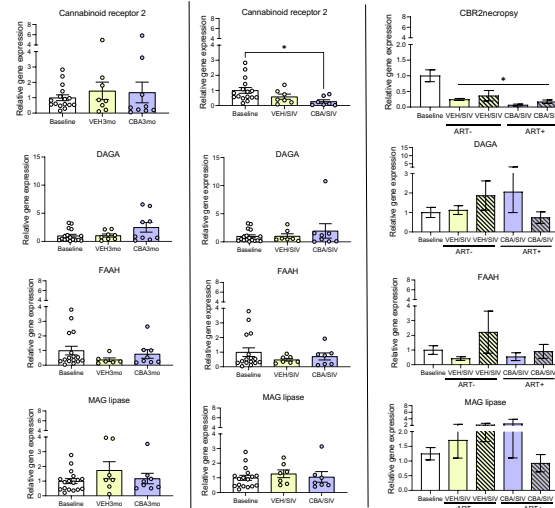


- mRNA was isolated from PBMCs collected at 4 timepoints: baseline, 3 months of CBA/VEH (vehicle) administration, viral setpoint, and at study end point (11.5 months post-SIV infection). Four experimental groups were studied: VEH/SIV/ART-; VEH/SIV/ART+; CBA/SIV/ART-; and CBA/SIV/ART+ (N=5-7/group).

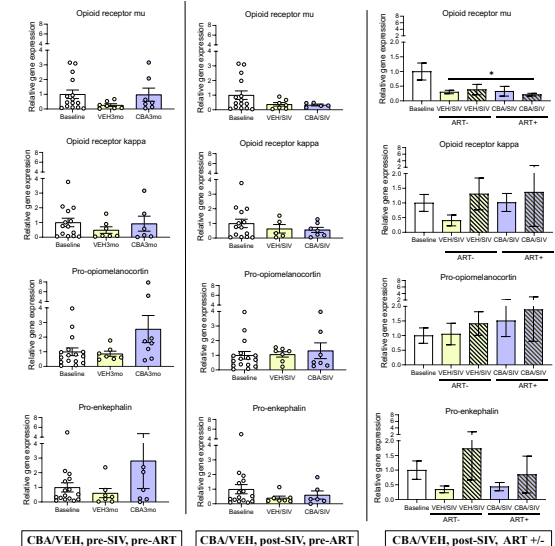


- mRNA was extracted using Qiagen RNeasy kit
- RNA was transcribed to cDNA using Qiagen Reverse Transcriptase
- Using qPCR each sample was normalized to the housekeeping gene RPS13 and the relative gene expression calculated using Pfaffl (Delta-Delta Ct) method

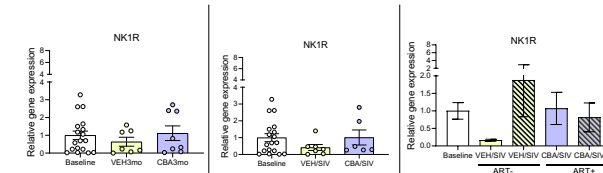
## Endocannabinoid System Gene Expression



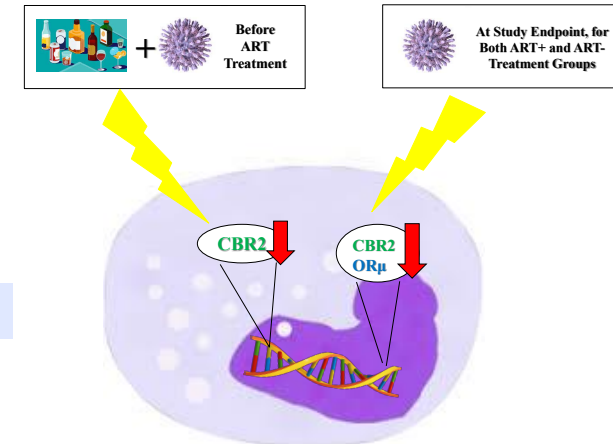
## Opioid System Gene Expression



## Neurokinin Receptor Gene Expression



## Conclusions



- CBR2 and ORM expression at study end point was significantly lower in all treatment groups compared to baseline.
- POMC/PENK/PDYN, SP, and NK1R expression was not different among groups.
- These findings suggest an SIV-associated modulation in anti-nociceptive pathways that may parallel the hyperalgesic state seen in PLWH.

## Future Direction

- PBMC gene expression will be compared and contrasted with that of the corresponding subject's frontal cortex gene expression to determine if PBMC changes reflect those seen in the CNS.
- PBMC gene expression in PLWH with various alcohol drinking histories will also be correlated with pain sensitivity test measures.

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# PEMBROLIZUMAB-ASSOCIATED MYOSITIS, MYASTHENIC CRISIS, AND MYOCARDITIS IN A PATIENT WITH METASTATIC UROTHELIAL CARCINOMA

## ACP 2022 RESIDENT STUDENT MEETING

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## INTRODUCTION

In 2011, immune checkpoint inhibitors (ICIs) revolutionized the treatment of various solid malignancies. Five years later, pembrolizumab was approved by the FDA as a therapy for metastatic urothelial carcinoma. ICI therapies function by blocking checkpoint proteins that play a role in downregulating the normal immune response. This inhibition allows for an unopposed co-stimulatory signal and an amplification of the body's immune defense against cancer.

Unfortunately, ICI therapy may induce toxicities termed immune-related adverse events (irAEs). Although neurologic irAEs occur in <3% of treated patients, the most frequent subtypes are neuromuscular with a novel triad of myasthenia gravis, inflammatory myositis and myocarditis. This syndrome carries a high mortality rate of at least 50%. Interestingly the phenotypes and antibody association of ICI-associated neurologic irAEs may differ from classically described autoimmune disease.

## CLINICAL COURSE

The patient developed progressive fatigable lower extremity weakness, neck extensor weakness, fatigue, and orthopnea. Early outpatient evaluation demonstrated mild transaminitis treated with prednisone, and cardiac workup revealed mild non-resolving troponinemia and transient electrocardiographic changes with normal echocardiogram. Weakness and fatigue progressed and neurologic evaluation was notable for oropharyngeal weakness, ptosis without miosis, limb-girdle weakness, areflexia, normal sensation and single breath test of 6 seconds. Due to clinical concern for ir-myasthenic crisis and ir-myositis with neuromuscular respiratory failure, he was admitted to the ICU.

He was treated with BiPAP, pyridostigmine, and 10 sessions of plasma exchanges, but decompensated. After intubation, he received methylprednisolone 1000 mg daily for 5 days followed by a 10 mg/week taper from 1 mg/kg. Given trace ventilation improvement, he was treated with IVIG 0.4 g/kg daily for 5 days. To reduce recurrence risk, he started mycophenolate mofetil and titrated up to 1000 mg twice daily. Electrodiagnostic evaluation 8 days after treatment confirmed presence of inflammatory myositis but did not demonstrate expected decrement on repetitive nerve stimulation. However, given that patient was taking pyridostigmine at the time, potential evidence of fatigability may have been masked.

Antibody workup was negative for AChR and MuSK antibodies, and demonstrated borderline positive anti-striated muscle total Ab (1:40) of unclear significance. Interestingly, cytokine workup demonstrated elevated IL-10 and high-normal soluble IL-2 receptor. There were no radiologic foci of muscle inflammation on MRI of neck and no CNS involvement on brain MRI.

## CASE

We report the case of an 85-year-old Caucasian male with metastatic high grade invasive urothelial carcinoma (T3N0M1) to lymph nodes, bone, and liver who developed ICI-associated myositis, myasthenic crisis, and mild ir-myocarditis 5 weeks after starting pembrolizumab as second-line therapy.

## DIAGNOSIS

In the context of clinical fatigability and elevated muscle enzymes, he was diagnosed with ir-myopathy, ir-myasthenia gravis, and mild ir-myocarditis. Appendicular strength stabilized and ventilation partially improved.

## CONCLUSION

ICI-associated myasthenia crisis, myositis, and myocarditis is incredibly rare, frequently fatal, and can differ from classically described autoimmune disease from a phenotypic, physiologic, and therapeutic standpoint, including cautious use of steroids in the acute myasthenic phase to downregulate T-cell response.

The authors recommend continued physician scrutiny to describe, diagnose, and treat these cases based on latest clinical evidence to identify novel conditions and improve understanding of the immunology and outcomes of these conditions.



## Introduction

- The United States Centers for Disease Control and Prevention (CDC) defines SDoH as the conditions in the environments in which people are born, live, learn, work, play, worship, and age that affect a wide range of quality-of-life outcomes and risks.
- There is no shortage of literature addressing the SDoH and its effects on individual patients, which identifies and discusses behaviors that place people at risk for contracting infectious diseases such as HIV.
- However, shifting the focus of these discussions to emphasize early intervention and prevention efforts, which sheds light on the wider set of forces that drive people to said behaviors, may be the key to combating SDoH and their influence on patient outcomes.

## Case Description #1

- 63-year-old HIV+ African American female presented to the emergency department (ED) with complaints of shortness of breath (SOB), cough, and chest pain for 3 days.
- She was admitted to the floor for sepsis secondary to community acquired pneumonia with concern for opportunistic infection given her history of uncontrolled HIV.
- Patient also reported to be living at a motel with her partner who was known to be selling her HIV medications.
- CD4 count was found to be 32.
- Chest x-ray in the ED revealed a pneumothorax and pneumomediastinum secondary to pneumocystis jirovecii confirmed by labs.
- Surgery was consulted but the decision was made to not place a chest tube.
- Inpatient stay was complicated by severe malnutrition due to patients' intolerance to PO intake because of oral and esophageal candidiasis.
- On the 6<sup>th</sup> day of admission patient was transferred over to hospice and made DNR but not DNI.
- On the 7<sup>th</sup> day of admission, the patient expired due to cardiopulmonary arrest secondary to sepsis from HIV opportunistic infection.

## Case Description #2

- 43-year-old HIV+ Caucasian male presented to the ED with complaints of SOB, vomiting, diarrhea, and weakness that had been progressing for 3 weeks.
- HIV was uncontrolled, and he reported that he had been self-medicating with natural herbal supplementations such as onions, coconut oils, and echinacea.
- He was admitted to the ICU and subsequently intubated secondary to respiratory distress. He also was noted to be in acute renal failure and required intermittent dialysis.
- CD4 count was noted to be 1, and a bone marrow biopsy stained positively for disseminated MAC.
- After extubation, the patient failed multiple video fluoroscopic swallowing exams which prompted MRI head to be ordered that showed multiterritorial infarcts.
- A workup was negative and by diagnosis of exclusion, a diagnosis of HIV encephalitis was made.
- The patient ultimately required placement of a PEG tube.
- With proper nutrition and pharmacological management, the patient continued to improve and was discharged to a rehab facility.

## Discussion

**Geography/Access to Care** : the epicenter of the nation's HIV epidemic has shifted from urban centers along the coasts to the 16 states and District of Columbia that make up the South.

- Mortality in the South is high—people with HIV have death rates that are three times higher than people in other states
- Main barriers faced by HIV-positive people living in rural areas were found to be transportation needs, discrimination and confidentiality concerns, stereotypically expected in small-town, remote settings.
- Catholicism, taboo, stigma, lack of sexual education→ lag in prevention services

**Health Literacy**: barriers to use of online health information among those of low socioeconomic status show that even when these individuals were provided with Internet access, they still experienced trouble seeking appropriate health information  
**Institutionalized racism**: promotes high rates of African American (AA) poverty, incarceration, and sexual violence, which deprive many AA women of psychosocial and economic resources necessary to maintain stable romantic partnerships

- Unemployment, sexual violence, access to adequate housing→ selling medications to make ends meet

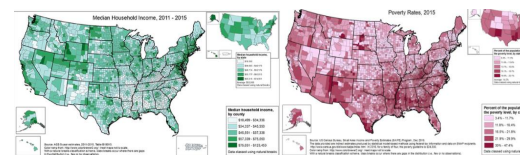
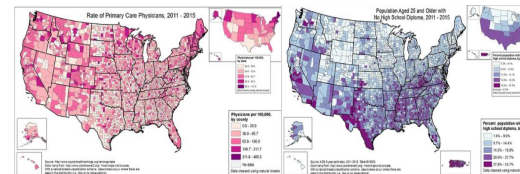
**Intersectionality**: multiple social categories intersect at the micro level of individual experience to reflect multiple interlocking systems of privilege and oppression at the macro, social structural level

- the results of a survey of aging, rural-dwelling, HIV+ people found that this group faces more challenges in accessing care than those not living in a rural area and that this population encounters a unique barrier because it can be difficult to determine whether symptoms are caused by HIV or old age
- Could Patient #1's lack of chest tube placement and eventual demise and Patients #2's survival be attributed to their differences in age, sex, and race? Was Patient #1's care equitable?

## Conclusion

- Two patients with similar prognostic severities, geographical proximity, access to care and insurance statuses ultimately ended up with very different dispositions.
- Both patients engaged in risky behaviors that further complicate their care.
- However, it would be more valuable to examine the SDoH that were at play which influenced each patients' behaviors.
- It is also plausible to explore the ideas of equity and equality as it relates to patients who present in similar fashions but have contrasting outcomes.
- The interplay of these ideas are complex at best and warrant further discussion.

## Images



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# The Curious Case of Neuromyelitis Optica

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## CASE PRESENTATION

- A 24-year-old African American female presented with a one-month history of rapidly progressive right-sided vision loss and right-sided headache associated with photophobia, pain, and flashes with eye closing.
- Past medical history: migraine
- Past surgical history: non-pertinent
- Social history: smoking- never, alcohol- none, recreational drugs- none.
- Family history is non-contributory.

## WORK-UP

- Vitals: BP 122/69, Pulse 73, Temp 36.9 C, Spo2 100%
- Physical exam was significant for complete R eye blindness without visual field defect. Dilated ophthalmology exam: Grade III optic disc edema with surrounding disc flame hemorrhages right eye, left eye flat with sharp margins
- CBC, CMP, and TSH were all within normal limits.
- MRI brain, MRI C, T, and L spine were performed [Figure A].
- With MRI finding, workup revealed a positive AQP-4 receptor antibody titer of 15.3 U/mL (negative < 2.9 U/mL), and final diagnosis was Neuromyelitis Optica (NMO).
- Infectious work-up and Lumbar puncture result were benign.
- To investigate the etiologies of NMO, CT chest was performed [Figure B]
- Pathology of the pulmonary lesion confirmed the diagnosis of mucinous adenocarcinoma.
- She initially received four rounds of plasmapheresis and rituximab with stabilization of symptoms for NMO.
- Patient underwent robotic right lower lobe lobectomy with mediastinal lymph node dissection in which all lymph nodes were negative for metastatic carcinoma.
- Her symptoms improved after treatment for NMO and lobectomy.

## IMAGES

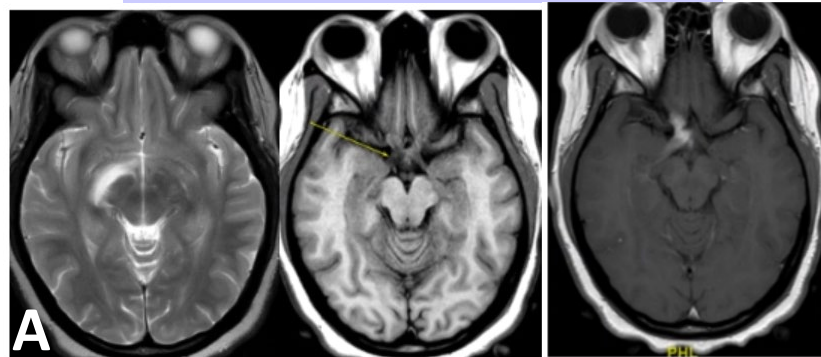


Figure A. MRA revealed a right optic glioma. MRI of the brain and orbits found abnormal contrast enhancement and T2 hyperintensity involving all segments of the right optic nerve (arrow) and proximal right optic tract, suggesting severe optic neuritis.

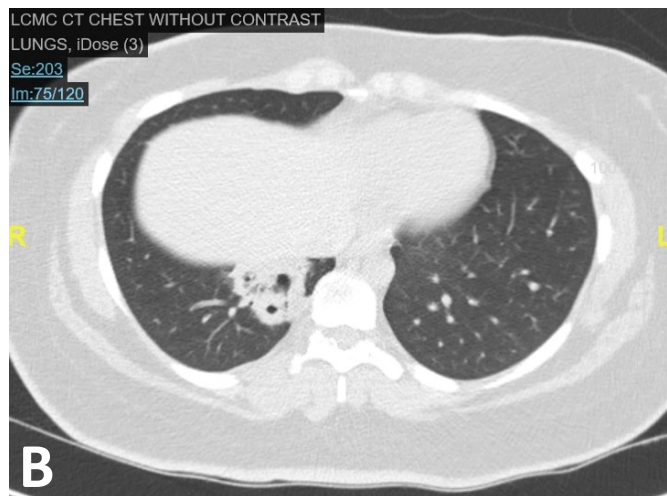


Figure B. CT Chest revealed incidental 3.8 x 3.3 cm lung lesion in the right lower lobe with multiple satellite pulmonary nodules.

## DISCUSSION

- Neuromyelitis optica is an autoimmune inflammatory demyelinating disease that tends to affect the optic nerves, spinal cord, and area postrema.
- It is associated with antibodies to aquaporin-4 (AQP-4) channels, which are the most abundant water channels in the central nervous system.
- Several studies have shown that areas of CNS inflammation in NMO tend to correlate with the expression pattern of AQP-4.
- The frequency of AQP-4 antibody seropositivity tends to be higher in patients with relapsing disease, optic neuritis, or longitudinally extensive transverse myelitis.
- NMO spectrum disorders (NMOSDs) can develop in patients with a tumor associated with AQP-4 antibodies, demonstrating a new paraneoplastic phenomenon.
- Hallmark features of NMOSD include acute attacks of bilateral or rapidly sequential optic neuritis or transverse myelitis in conjunction with seropositivity for AQP-4 antibodies.
- NMOSDs are very rare with prevalence ranging from 0.37 to 10 per 100,000 with median age of onset 32-41 years.

## CONCLUSIONS

- The ongoing evidence that AQP-4 positivity in NMOSD can serve as a paraneoplastic marker should raise concern for potential malignancy screening in individuals positive for AQP-4.
- Breast carcinoma is the most common tumor associated with paraneoplastic NMOSD, but other malignancies such as lung adenocarcinoma have also been reported.
- Studies show that NMOSDs are more likely to be paraneoplastic in patients > 50 years, but our case of a 24-year-old shows that it can occur much earlier.
- Further research is needed to further investigate the clinical utility of AQP-4 levels as an oncologic marker in the management of patients diagnosed with NMOSD.

# Wondering About Wunderlich Syndrome: A Rare Case of Spontaneous Renal Hemorrhage

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## Introduction

- ❖ Wunderlich Syndrome (WS) is the rare syndrome of spontaneous renal subcapsular and retroperitoneal hemorrhage in the absence of known trauma. Traumatic and iatrogenic causes must be excluded prior to making the diagnosis.
- ❖ Classic presentation of WS includes Lenk's triad: acute onset flank pain, flank mass, and hypovolemic shock. Twenty-five percent of cases present with the triad, while 60-90% present only with flank pain.
- ❖ The main causes of WS are renal masses, and the diagnostic procedure of choice is CT with contrast.
- ❖ Prompt treatment with fluids and pressors should be initiated in hemodynamically unstable patients. Surgical treatment is preferred in patients diagnosed with renal malignancy and in cases of hemodynamic instability.

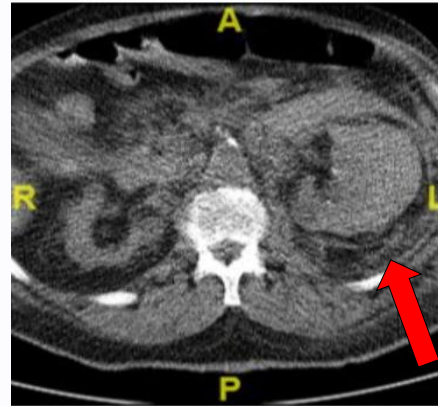
## Case Presentation

- ❖ A 77-year-old man with history of hypertension, diabetes mellitus, atrial fibrillation on Eliquis, chronic lymphocytic leukemia (CLL) in remission, & end stage renal disease on hemodialysis presented to an outside facility for generalized weakness, profound hypotension, and flank pain.
- ❖ He complained of back and flank pain of 2-3 days. He was found to have microcytic anemia requiring blood products, leukocytosis, & tachycardia.
- ❖ CT abdomen without contrast revealed a renal mass with hypothesized etiology of abscess given his leukocytosis. The patient was given IV antibiotics, transfused blood, and transferred to our hospital for Urology services.

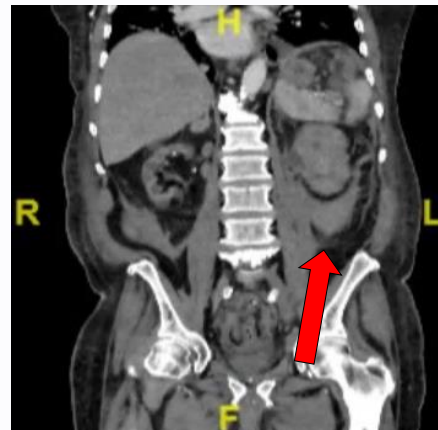
## Hospital Course

- ❖ Repeat CT abdomen with contrast characterized the findings as a large subcapsular hematoma around the left kidney with hemorrhage. A left renal artery calcification was also noted.
- ❖ It was realized that the patient's SIRS was due to hemorrhage rather than sepsis. The leukocytosis was ultimately found to be due to a return of his CLL.
- ❖ Eliquis was held. He improved with transfusion and the hemorrhage resolved spontaneously.

## Images



Images characterize marked enlargement of left kidney with subcapsular hematoma and extensive hemorrhage tracking along left retro mesenteric fascial planes, extending into pelvis.



## Discussion

- ❖ Wunderlich Syndrome (WS) is the rare syndrome of spontaneous renal subcapsular and retroperitoneal hemorrhage in the absence of known trauma and iatrogenic causes.
- ❖ Presentation includes Lenk's triad: acute onset flank pain, flank mass, and hypovolemic shock.
- ❖ Our patient presented with flank pain, hypotension, and visible mass on imaging.
- ❖ Prominent underlying etiologies include renal neoplasms (60%), most commonly renal cell carcinoma (RCC), and renal vascular disease (20%) such as polyarteritis nodosa and renal artery disease. Other causes include cystic renal disease, infection, and anticoagulation induced.
- ❖ Possible etiologies in our patient include neoplasm, renal cysts from ESRD, and anticoagulation induced.
- ❖ As in our patient, these presentations are often thought to be due to renal colic or pyelonephritis, but physicians ought to consider WS in patients with flank pain, hemodynamic instability, and low hemoglobin.
- ❖ Knowledge of WS should prompt emergent imaging, notably CT with contrast over non-contrast imaging or ultrasound techniques as well as further work-up to determine the underlying cause.
- ❖ Acute treatment should focus on stabilizing the patient with pressors and fluids. Severe hemodynamic instability should prompt surgical evaluation or interventional angioembolization.
- ❖ Long-term management depends on etiology. Patients with suspicion for RCC should undergo MRI, renal biopsy, and surgical resection.
- ❖ Spontaneous perinephric hematoma of unknown etiology should be followed up regularly with a CT image for concerning of impending renal tumor.

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## Introduction

It is common for patients to miss doses of medications prescribed for chronic diseases, with the most self-reported reason being difficulty remembering whether they had consumed a specific dose.<sup>1</sup> Polypharmacy is the regular use of at least five medications. Skipped medication doses and polypharmacy lead to poorly controlled chronic conditions, higher morbidity, and increased hospitalizations<sup>2</sup>. Pill Packing (PP) provides a mechanism for patients with polypharmacy to self-monitor medication consumption and limit the decision-making burden about which medications to take at different times<sup>3</sup>.

The Ochsner Pharmacy and Wellness has performed PP for the MedVantage Clinic (MVC), a primary care hub for complex patients, since 2017. In 2019, Yeung et al. (2019) demonstrated that PP in conjunction with the MVC improved health markers for this cohort. Systolic BP (SBP), hemoglobin A1c (HbA1c), and low-density lipoproteins (LDL) levels significantly improved. When uncontrolled, these markers are risk factors for cardiovascular disease (CVD) incidents, such as myocardial infarctions (MI) and cerebral vascular accidents (CVA). This study aims to explore the PP impact on health markers and further investigate whether CVD incidents are also impacted.

## Methods

A retrospective chart review was performed on 75 MVC patients currently utilizing PP. To be included, patients had to be a current MVC patient, enrolled in PP for at least 6 months, and have at least one of the following conditions treated with medication in their pill pack: hypertension, type 2 diabetes, and hyperlipidemia. Patients were excluded if they either were not enrolled in pill packing for at least 6 months or did not have any A1c, SBP, or LDL measurements within 6 months after the intervention. We also reviewed major CVD events (MI and CVA) and ED visits in the 6 months following pill packing initiation.

We used a paired sample t-test to compare the average A1c, SBP, and LDL values from before the intervention and after the intervention. We calculated the cumulative incidence of MI and/or CVA.

## Results



Figure 1. Dispill pill packs<sup>5</sup>.

Among the 75 patients included in this study, average SBP, LDL, and A1c levels all improved 6 months after the PP interventions. However, these results were not statistically significant.

Prior to the intervention, average A1c among this cohort was 7.92. 6 months after PP, average A1c was 7.80 (p=0.73). SBP 6 months prior to PP was 136. 6 months after PP, the average SBP was 134 (p=0.60). Average LDL prior to PP was 100. After 6 months, it was 89 (p=0.240).

	6 months prior	6 months after	p-value
HbA1c (%)	7.92	7.80	0.73
SBP (mmHg)	136	134	0.6
LDL (mg/dL)	100	89	0.24

Table 1. A1c, LDL, SBP 6 months prior to and after pill packing.

### MI and/or CVA within 6M since PP started

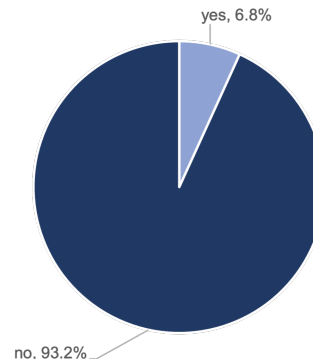


Figure 2. Cumulative incidence of MI and/or CVA within 6 months after PP.

## Discussion

Although all health markers improved with PP, the changes were not statistically significant. We believe this may be due to our small sample size resulting from our exclusion criteria.

Many patients in the MVC cohort have multiple comorbidities and are considered at higher risk for COVID-19 complications based on the Epic COVID Risk Score<sup>6</sup>. Throughout 2020, many patients switched to virtual and telephone visits to limit COVID exposure, which consequently resulted in missed lab draws and missing records of vital signs in the clinic environment. Due to quarantine restrictions, exercise routines and diet were negatively affected as well<sup>7</sup>.

Interpretation of the major CVD cumulative incidence of 6.8% was unclear due to a lack of data in this category for a matched population. Analysis is pending regarding the major CVD events in the 6 months prior to PP.

## Conclusions

Given prior results from the Yeung et al. study on this cohort in 2019, we expected statistically significant improvements in A1c, SBP, and LDL levels following PP intervention. Further research is needed to determine the possible interplay between the COVID-19 pandemic and PP practices that may have reduced its impact on health markers. Additionally, a comparison of this CVD incident rate to a matched control group or an analysis of the data 6 months prior to PP will need to be performed to determine the impact of PP on major CVD incident.

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# Assessing Clinical, Demographic, and Epidemiological Variables Among the First 500 COVID-19 Patients in an Urban Emergency Department



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## Introduction

As of January 12, 2022, there have been over 62 million confirmed cases of COVID-19 and more than 840,000 deaths in the United States<sup>1</sup>. Given the ability of the virus to target multiple organ systems, many patients were hospitalized on average between 4-21 days<sup>2</sup>. In addition, certain comorbidities predisposed patients to worse health outcomes when infected with COVID-19. It was vital that emergency medicine physicians considered these factors when determining whether to discharge or admit patients.

## Objectives

Our study sought to characterize the first 500 COVID-19 patients seen in the emergency department of an urban hospital by analyzing dispositions, discharge statuses, patient demographics, O2 requirements, ventilatory interventions, and comorbidities. We hypothesized older patients with lower O2 saturations, increased need for ventilatory support, and certain comorbidities and demographics were more likely to be admitted to the hospital.

## Methods

This study was a retrospective chart review of the first 500 COVID-19 patients who tested positive at an urban emergency department between March 9, 2020 – March 24, 2020. We queried the medical records for patients meeting qualifying criteria. Data was collected using REDCap including basic demographics, comorbidities, respiratory rates, initial O2 saturations, paO2, as well as respiratory interventions with final O2 saturations. All statistical analyses were carried out utilizing SAS 9.4. We used Fisher's exact or Pearson chi-square tests to assess the associations between categorical variables and disposition status. To compare admitted and discharged patients' continuous characteristics, we utilized two sample t-tests.

## Results

Discharge Status	n=	%
Home	435	93.15
Rehabilitation/Nursing Home	13	2.78
Death	19	4.07

Insurance	n=	%
Government	226	45.75
Private	203	41.09
Uninsured	63	12.75

Race	n=	Percent
Black/African American	436	88.08
White	24	4.85
Unknown/Not Reported	30	6.06

Age	Mean	Minimum	Maximum	Std Deviation
	48.642	18	98	15.349

Table of Disposition by Ethnicity

Disposition	Hispanic	Non-Hispanic	Unknown	Total
Admission	1	124	1	126
Discharge	23	344	2	369
Total	24	468	3	495

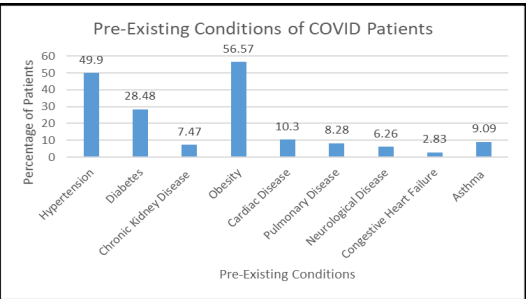
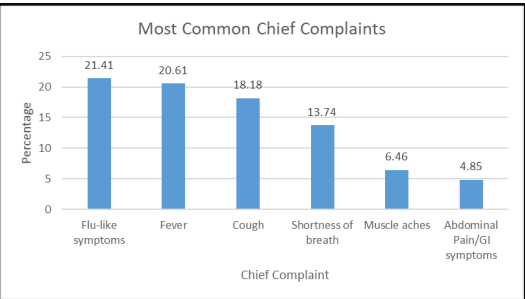
Table of Disposition by Homelessness

Disposition	Housed	Unhoused	Total
Admission	126	0	126
Discharge	366	3	369
Total	492	3	495

Table of Disposition by Sex

Disposition	Female	Male	Other	Total
Admission	69	57	0	126
Discharge	209	159	1	369
Total	278	216	1	495

P= 0.8174, therefore there is no relationship



## Results

Our study population consisted of 56% females. Regarding race demographics, 88.1% of total patients were black, 4.8% were white, and 0.6% were biracial. 5% of the patients identified as Hispanic. 0.4% were American Indian. The most common comorbidities were hypertension (50%), diabetes (28.8%), and obesity (56.6%). Most common chief complaints were flu-like symptoms (21.2%), fever (20.6%), cough (18.4%), and dyspnea (4%). The mean age for admitted patients was 56 years old, significantly higher than the mean age of discharged patients, which was 46 years old (p<0.0001). Data analysis indicated that 74.6% of the patients were discharged home after being seen in the ED, and 25.4% were admitted to the floor. 0.8% of patients died while in the ED. Of the patients who were admitted, 90% were black, and 2% were white. Of the patients who were discharged, 87% were black, and 6% were white. There was a statistically significant association between race and discharge status (p=0.0286). There was no statistically significant difference regarding the sex of patients who were admitted versus discharged. We observed statistically significant associations between hypertension (p<0.0001), diabetes (p<0.0001), chronic kidney disease (p<0.0001), obesity (p=0.0022), cardiac disease (p<0.0001), pulmonary disease (p<0.0001), neurological disease (p=0.0025), congestive heart failure (p=0.0105) and cancer (p=0.0421) and disposition status.

## Conclusions

Analysis of our data suggests that Black patients of older age fared worse health outcomes when infected with COVID-19, as they were the patients who were often admitted to the hospital as opposed to being discharged home. Additionally, there were statistically significant associations between all pre-existing conditions and disposition statuses except asthma. Further exploration is needed to better understand the results. Next steps will be to do additional investigation to analyze the relationships between patient demographics, respiratory measures and pulmonary function, and dispositions to see if there are any notable links.

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# A Rare Case of Cefazolin Induced Coagulopathy and INR Derangement

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## Introduction

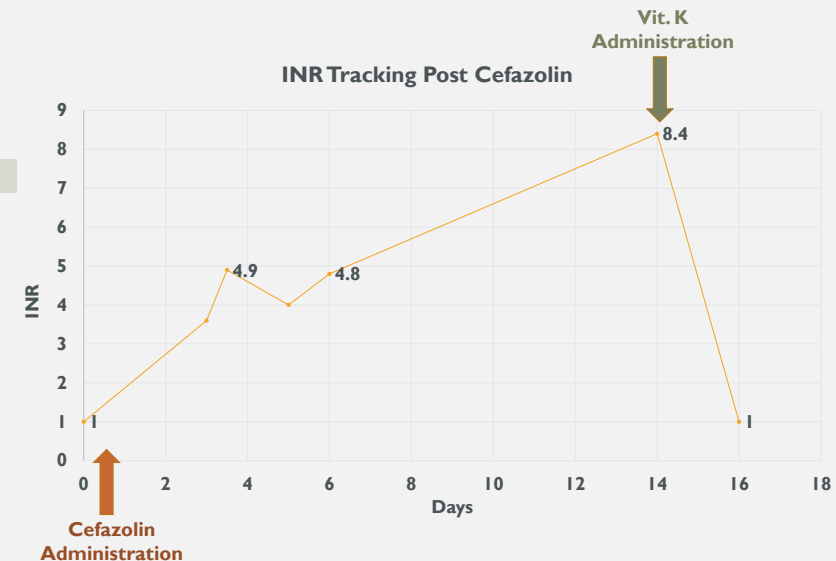
Cefazolin is a first-generation cephalosporin which is indicated in a wide variety of clinical settings. Particularly, this antibiotic has been used before, during, and after surgical procedures to prevent secondary infections. There are reports of patients having severe coagulopathic derangements while receiving intravenous Cefazolin. Such effects are more commonly seen in patients with diabetes, renal functional impairment, and malnourishment. The exact mechanism of this association remains unknown.

## Case Presentation

A 53 y.o. female with a history of duodenal adenocarcinoma status-post Whipple Procedure, bicuspid aortic valve, and heart failure presented for evaluation of chest pain, decreased energy, and dyspnea on exertion. Echocardiography revealed severe aortic stenosis and an ejection fraction of 25-30%. She subsequently received mechanical aortic valve replacement (AVR) with no operative complications. She received Cefazolin 2g IV three times daily on the first and second day of admission. Cardiology recommended starting the patient on Warfarin, per protocol for mechanical AVR. However, the patient was not eligible for this medication due to an increase in international normalized ratio (INR) of unknown origin. The patient's baseline INR was 1.0. On the third day of admission INR rose to 3.6, with a repeat INR of 4.7 and 4.9 that day. She had normal liver studies, mixing studies, and no evidence of active bleeding. She had not received any Warfarin or anticoagulation. Suspicion for DIC was low with stable hemoglobin, normal platelet count, and normal fibrinogen levels. She was discharged with Aspirin with plan to titrate warfarin outpatient. However, during outpatient testing 14 days post Cefazolin administration, INR rose to 8.4. At this time, she was given 5mg Vitamin K with normalization of INR to 1.0 two days later.

## Discussion

Prior case studies have identified very similar coagulopathies secondary to Cefazolin use. Proposed mechanisms include alteration of gut flora inhibiting absorption of vitamin K; however, this data has been shown to be inconclusive. Recent studies point to inhibition of epoxide reductase and/or gamma-glutamyl-carboxylase through Cefazolin's thiol group, causing Vitamin K inhibition. Our patient's normalization of INR after Vitamin K administration furthers this theory. Additionally, studies show malnourished patients are most susceptible to this side effect. Our patient's BMI was 19 at the time of surgery, in addition to possible malnourishment secondary to Whipple procedure. Due to the popularity of Cefazolin use for surgical infection prophylaxis, more emphasis ought to be placed on monitoring for potential adverse side effects of the drug. INR in high risk patients, such as those with history of malnourishment, should be carefully monitored after Cefazolin administration.



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# Detection of Latent Autoimmune Diabetes in Adults in a 40-year-old with Rheumatoid Arthritis and Hashimoto's Hypothyroidism

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## Introduction

- ❖ Latent Autoimmune Diabetes in Adults (LADA) is a heterogenous autoimmune disease differentiated from both type I and Type II diabetes due to its unique course of development in a patient.
- ❖ LADA is characterized by an age of onset >30, presence of any islet cell autoantibody, and an absence of insulin requirement for at least 6 months after diagnosis.
- ❖ It is believed to be under-diagnosed in the diabetic patient population, and its detection may help patients receive better-tailored care.

## Case Presentation

- ❖ An obese 40-year-old male with no history of diabetes presented with polyuria, polydipsia, blurry vision, and weakness for one week with a home glucose reading of 478.
- ❖ Medical history includes rheumatoid arthritis treated with adalimumab, and a family history of Type II Diabetes.
- ❖ Physical exam revealed an obese male with tachycardia and elevated blood pressure.
- ❖ Lab evaluation indicated a blood glucose of 337, and findings consistent with borderline DKA.
- ❖ HbA1c was 10.0. He was admitted for IV fluids and subcutaneous basal/bolus insulin.
- ❖ Further evaluation revealed a free T4 of 0.48, TSH of >84.0 with positive Thyroid peroxidase antibodies (TPO), adding a new diagnosis of Hashimoto's hypothyroidism.

## Hospital Course

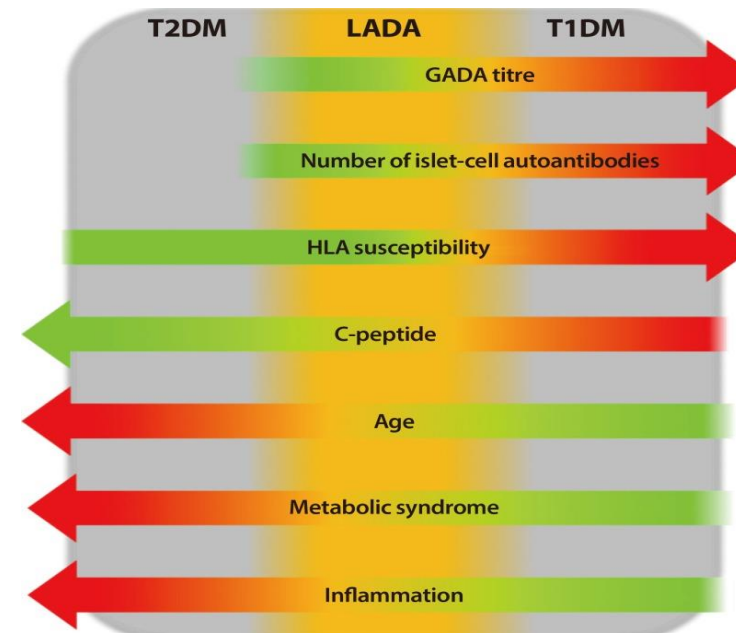
- ❖ His anion gap resolved, blood glucose improved, and he was started on levothyroxine.
- ❖ Further history revealed treatment for hyperthyroidism as a teenager.
- ❖ Given his body habitus, age of onset, and family history, he was initially diagnosed with type II Diabetes.
- ❖ However, given his rheumatoid arthritis and newly diagnosed autoimmune thyroid disease, he was tested for anti-GAD65 antibodies to screen for LADA.
- ❖ Lab results several days post-discharge revealed the presence of anti-GAD65 antibodies, indicating his diabetes was likely autoimmune, rather than solely metabolically derived.
- ❖ Therefore, a diagnosis of LADA was made.

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## Discussion

- ❖ LADA can be thought of as a hybrid between types I and II diabetes.
- ❖ The disease presents later in life (>30) and does not always require initial treatment with insulin, as is typical in type II, but also has present at least one circulating autoantibody and insulin is often required later in the disease course, as is typical in type I.
- ❖ Importantly, LADA is a progressive disease and regardless of stage at diagnosis, most patients will eventually require insulin.
- ❖ This patient's HbA1c indicated he would benefit from outpatient insulin therapy as opposed to non-insulin regimens or simple lifestyle modification, though this regimen would not be appropriate for all newly diagnosed LADA patients.
- ❖ This case demonstrates the usefulness of testing for diabetes autoimmune disease in the setting of other autoimmune conditions.
- ❖ Prompt diagnosis of LADA can help prevent episodes of unexpected DKA in an erroneously diagnosed type II diabetic through tighter diabetes control methods.



# Don't Be so Littoral: False-Positive Echinococcus Antibody Testing Masks a Case of Littoral Cell Angioma

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## Learning Objectives

- Describe a case of Littoral Cell Angioma
- Discuss the impact of false-positives results on length of stay, treatment costs, and diagnosis
- Highlight the utility of pretest probability

## Case Presentation

- 31-year-old woman with asthma presented to a hospital in New Orleans, Louisiana with one week of worsening upper quadrant abdominal pain associated with vomiting, chills, and cough.
- Had presented one week prior with profuse, watery diarrhea, CT at the time showed splenomegaly, and was discharged with presumed gastroenteritis
- Since prior discharge had intermittent upper abdominal pain associated with anorexia, which resolved and was replaced with vomiting, chills, and cough
- Denied sick contacts or recent travel, denied alcohol, tobacco, drug use and worked as manager at fast food restaurant.
- Found to be COVID positive in the ED.

## Physical Exam

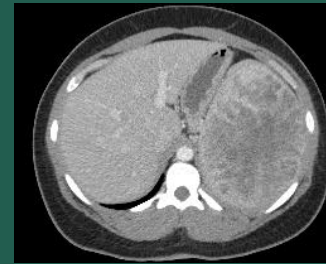
VS: T: 100.1, HR: 117, RR: 18, BP: 134/72, SpO2 97% room air

General: In no acute distress, Axx4

Respiratory: Clear to auscultation bilaterally,

Abdomen: **Diffuse tenderness that localized to the left upper quadrant**; non-distended, active bowel sounds

5.4	8.9	138	106	6	93
	31.8	3.1	26	.9	
With Normal diff					
Albumin 3.2					
ALT 20					
Rest of CMP within normal limits					



CT Abd/Pelv w/ con: concerning for enlarging splenic abscess, small subcapsular lesion at anterior aspect of left hepatic lobe suspicious for early abscess formation; suspected bilateral adnexal tubular structures w/ surrounding inflammation is concerning for hydrosalpinx/PID



## Hospital Course and Outcome

- Admitted to medicine and started on broad spectrum antibiotics
- Interventional radiology consulted for possible drainage of splenic abscess, however there was no clear pocket
- Gynecologic evaluation ruled out PID, though patient was found to be Trichomonas positive and was treated with metronidazole
- Echinococcus antibody testing, and repeat testing positive, prompting the patient to be started on the appropriate therapy, albendazole
- The patient was intermittently febrile to 102-103 F, which resolved with initiation of albendazole treatment
- Surgical intervention was delayed until completion of a 14-day long course of albendazole
- Samples sent to CDC for confirmatory testing negative for Echinococcus
- After two weeks of albendazole treatment, splenectomy and left partial hepatectomy were performed, revealing littoral cell angioma of spleen and focal nodular hyperplasia of the liver
- Patient was lost to follow-up, with presumed resolution of symptoms

## Discussion

- Littoral cell angioma (LCA) is a rare splenic tumor, comprised of littoral cells of the red sinus shores of the spleen [1]. Littoral cells are uniquely identified as having both histiocytic and endothelial cell markers. Described primarily through case studies, the pathogenesis is poorly understood. LCA typically presents with vague abdominal pain or is discovered incidentally.
- Echinococcosis (hydatid disease) in endemic areas is caused by the larval stages of tapeworms of the genus Echinococcus. Echinococcus granulosus causes cystic echinococcosis, and E. multilocularis causes alveolar echinococcosis. The most common locations for the cysts are liver and lung, as well as spleen and various other organs.

## Conclusion

- There was low probability of Echinococcus being the causative agent in this case given the lack of travel to an endemic area or other risk factors
- The positive Echinococcus antibody test prompted an expensive course of albendazole (average retail price \$812,34)[3], and a lengthy, 26-day hospital stay.
- Utilize pretest probabilities when ordering tests to both diminish costs and hasten the path to diagnoses to reduce length of hospital stay

## Acknowledgments

- Special thanks to Dr. Mushatt, Dr. Craig, Dr. Jang, and all others who participated in the care of this patient.

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# Does Changing Adductor Canal Block (ACB) with Ropivacaine to Liposomal Bupivacaine Improve Patient-reported Outcomes and Reduce Opioid Prescribing After Total Knee Arthroplasty?

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## Introduction

Total knee arthroplasty (TKA) is a common surgery with a painful recovery. Newer analgesic techniques to reduce opioid use and pain after total knee arthroplasty (TKA) include preoperative cryoneurolysis, adductor canal block (ACB), and interspace between the popliteal artery and the capsule of the posterior knee (IPACK) block. [2,3] The purpose of the present study was to evaluate whether changing ACB with ropivacaine, a traditional local anesthetic, to ACB with liposomal bupivacaine (LB), an extended release local anesthetic, would provide superior pain relief and reduce opioid requirements in the first 2 and 12 weeks following TKA.

## Application & Anatomy

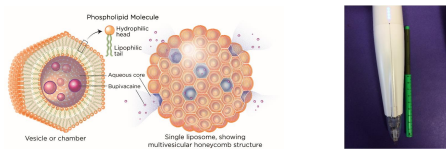


Figure 1: Liposomal Bupivacaine structure [4]



Figure 2: Cryoneurolysis device [1]

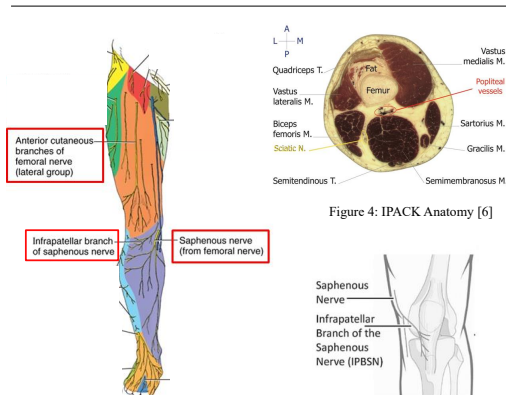


Figure 3: Lower limb nerve distribution [5]

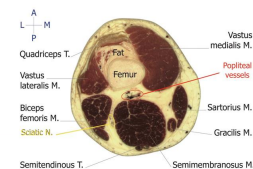


Figure 4: IPACK Anatomy [6]



Figure 5: IPBSN penetration [7]

## Materials & Method

This was a retrospective chart review of 140 consecutive primary TKA patients at a single site who received ACB with ropivacaine (ACB-R; n=70) or ACB/IPACK with LB (ACB/IPACK-LB; n=70) in the context of multimodal analgesia including preoperative cryoneurolysis. Main outcomes were filled opioid prescriptions (morphine milligram equivalent; MME) at discharge and over the first 12 weeks after TKA as well as patients-reported outcomes (PROs) assessed by the Knee Osteoarthritis and Outcomes Score (KOOS) and PROMIS-29 Pain Intensity and Pain Interference scales at 2 and 12 weeks post-surgery.

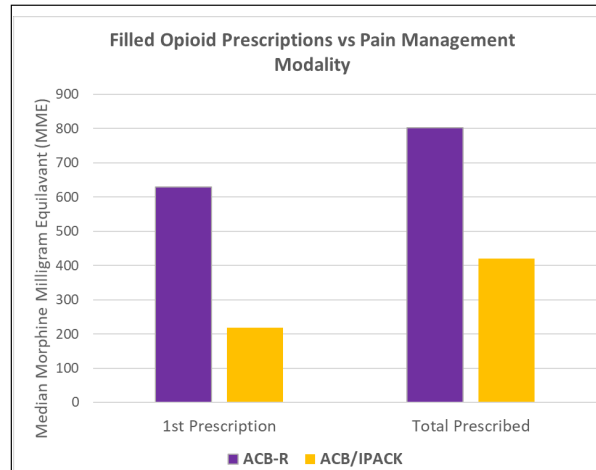
## Patient Demographics

	ACB-R (n =70)	ACB/IPACK (n =70)	p-value
	----- mean (SD) -----		
Age, years	68.9 (9.2)	68.3 (8.5)	0.899
BMI, kg/m <sup>2</sup>	31.3 (4.8)	32.6 (5.1)	0.133
Deformity, °	8.0 (4.3)	7.7 (4.5)	0.615
	----- % (n) -----		
Gender			0.269
Male	25.7 (18)	34.3 (27)	
Female	74.3 (52)	65.7 (47)	
Race			0.626
African American	35.7 (25)	38.6 (27)	
White	62.9 (44)	57.1 (40)	
Other	1.4 (1)	4.3 (3)	

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## Opioid Results



	ACB-R (n=58)	ACB/IPACK (n=65)	p-value
	----- median (interquartile ranges) -----		
1 <sup>st</sup> Prescription (MME)	630 (420, 630)	218 (200, 225)	< 0.0001
Total Prescription (MME)	803 (630, 1380)	420 (225, 810)	< 0.0001

## Conclusions

The median MME for the discharge opioid prescription and all opioid prescriptions was, respectively, 65% (p<0.0001) and 48% (p<0.0001) lower for patients in the ACB/IPACK-LB compared with the ACB-R group. ACB/IPACK-LB was associated with significantly better PROs 2 weeks after TKA compared to ACB-R. ACB/IPACK with LB may reduce opioid requirements during acute and short-term recovery while improving PROs during early recovery compared with ACB-R in the context of multimodal analgesia including preoperative cryoneurolysis.

## INTRODUCTION

- Shingles (herpes zoster) etiology
- Demographic
- Complications – postherpetic neuralgia (PHN), herpes zoster oticus, herpes zoster ophthalmicus, and bacterial superinfection
- Zostavax® vs. Shingrix®
  - Contraindications
  - Efficacy
- 65.5% of adults ≥60 years of age remain unvaccinated in the U.S., with rates being 9.3% below the national average in Louisiana.
- The purpose of this study is to determine if educational patient surveys on Shingles, its complications, and its prevention can increase Shingrix® vaccination rates among patients of the Louisiana State University ophthalmology clinic.

## HYPOTHESIS

Providing educational patient surveys on shingles, its complications, and its prevention will increase Shingrix® vaccination rates among patients of the LSU ophthalmology clinic who are ≥50 years of age.

## METHODS

- A brief educational patient survey was conducted by all patients while in the waiting room prior to their ophthalmology visits
- Data collected included patient age and current vaccination status (Figure 2)
- Educational portion of survey was designed to reduce medical jargon and include basic information on Shingles, the Shingrix® vaccine, and CDC recommendations (Figure 1)
- Final survey question assessed interest in receiving the Shingrix® vaccine, and when
- Upon return to clinic, patients repeat the survey; previous responses are compared to responses to determine if patient has received the Shingrix® vaccine
- Independent and dependent variables

### What is Shingles?

- Shingles is a painful rash that is caused by the same virus that causes chickenpox
- Anyone who has had chickenpox may develop Shingles later in life
- Even after the rash goes away, painful burning and tingling remains in the area (postherpetic neuralgia)
- Shingles that occurs near the eye may result in permanent blindness (herpes zoster ophthalmicus)
- Shingles that occurs in the ears may cause hearing loss (herpes zoster oticus)

### What is Shingrix?

- The Shingrix vaccine is more than 90% effective at preventing shingles and the complications of the disease
- Two doses of the vaccine are required, separated by 2-6 months

### Who needs the vaccine?

- Everyone ≥ 50 yrs of age
- Should I get the Shingrix vaccine if I don't think I've ever had chickenpox? Yes
  - More than 99% of Americans ages 40 or older have had chickenpox, even if they don't remember getting the disease
- Should I get the Shingrix vaccine if I've already had the Zostavax vaccine? Yes
  - Shingrix is the CDC-recommended vaccine due to better prevention against Shingles than with the Zostavax vaccine
- Should I get the Shingrix vaccine if I've already had shingles? Yes
  - Yes, the Shingrix vaccine can help prevent recurrences of the disease

Figure 1: Educational portion of patient survey

	Number of Patients
No	1074 (73%)
Yes, but unsure which one or how many	221 (15%)
Yes, Zostavax	65 (4%)
Yes, 2 doses of Shingrix	115 (8%)

Figure 2: Have you been vaccinated for Shingles?

	Number of patients
No	695 (59%)
Yes	422 (36%)
Unsure	62 (5%)

Figure 3: Now, after reading this information, are you planning on having the vaccine?

## RESULTS

- Data collection is still in progress
- 1475 data points (i.e. the survey has been completed 1475 times)
- 92% of patients surveyed either had not been vaccinated with Shingrix® or were unsure of their vaccination status
- 36% of patients that completed the survey expressed plans to receive the vaccine
- The survey has been given to the same patient upon their return to clinic 34 times; 3 of these "repeat" patients had gotten the Shingrix® vaccine

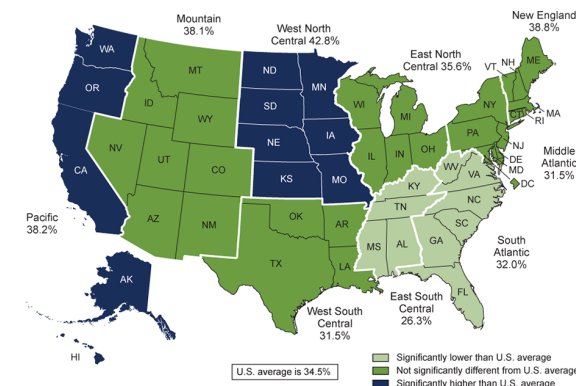


Figure 4: Percentage of adults aged 60 and over who had ever received a shingles vaccine, 2018

## DISCUSSION

- 27.1% of patients do not know the vaccine is needed
- Use of a low-literacy patient education tool made patients 5 times more likely to receive the pneumococcal vaccine
- Through the use of the educational patient survey on Shingles, its complications, and its prevention, this study is designed to determine if patient education can increase Shingrix® vaccination rates among patients of the Louisiana State University ophthalmology clinic.
- Limitations
  - Confounding variables
  - Accuracy of patient responses
- It is of paramount importance that clinicians promote vaccinations for individuals ≥ 50 years of age



# A Triple HIT Dilemma: Balancing Pulmonary Emboli, Hemorrhagic Shock, and Heparin-Induced Thrombocytopenia Syndrome

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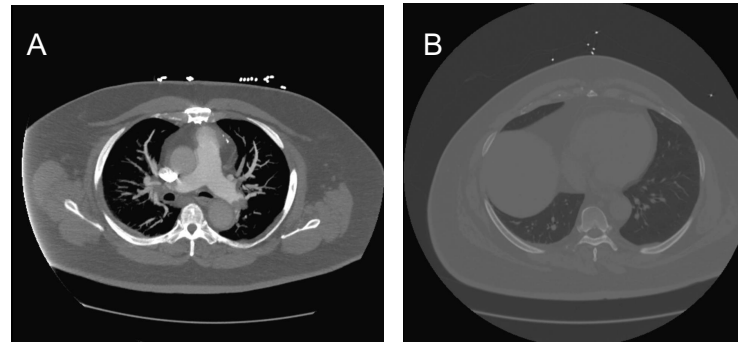
## Introduction

- **Heparin Induced Thrombocytopenia (HIT)** is an immunologically mediated drug reaction to unfractionated heparin.
- It is of upmost importance to **personalize management** for patients with HIT.

## Patient Presentation

- **67 year old male with obesity** (BMI 43) and recent **prostatectomy** admitted 2 weeks for **bilateral pulmonary emboli (PE)** (**Figure 1A**).
- Discharged on an enoxaparin bridge to warfarin therapy.
- Readmitted for hemorrhagic shock due to retroperitoneal hematoma.
- Anticoagulation was held until after his Hgb stabilized.
- **Unfractionated Heparin was then started after Hgb stabilized.**
- 24 hours after Heparin administration:
  - Exam showed R flank bruising
  - Platelet Trend: 184 => 111 (+11 hours) => 89 (+24 hours) => 71 (+36 hours) => 67 (+40 hours)

## Clinical Course



**Figure 1 – (A) Bilateral Pulmonary Emboli on admission, (B) Retroperitoneal Hematoma after Heparin administration.**

- **Differential Diagnoses for Thrombocytopenia:** Platelet Disorder (HIT, DIC, TTP, ITP), Leukemia, Anemia, Trauma, Enlarged Spleen, Liver Disease, Ethanol, Toxins, Sepsis, Pseudothrombocytopenia
- **Final Diagnosis:** Heparin-Induced Thrombocytopenia (50% acute decrease in platelet count over 48 hours since Heparin administration)
  - HIT Ab = positive
  - Platelet Serotonin-release confirmatory assay = Positive
  - 4 T's for HIT Score = 5 out of 8
  - Held Heparin => Platelets improved: 89 (+24 hours, held heparin) => 90 (+36 hours) => 116 (+60 hours) => 124 (+72 hours)

## Discussion

- **Immediately held Heparin drip and trend platelet count.**
- **Low-dose IV Argatroban therapy** as anticoagulant for HIT and PE's.<sup>1</sup>
  - Direct Thrombin Inhibitor (DTI) and Direct Oral Anticoagulant (DOAC) were not used (BMI of 43, AKI on CKD).
  - Balancing anti-coagulation with hemorrhage risk.
  - Rapid reversal if needed (Short half-life).
- Other options for non-heparin anticoagulant:
  - Rapid management or concurrent liver disease patients: **Fondaparinux**
  - Other patients: **DOAC** (i.e. Apixaban)
- Transition from **Argatroban** to outpatient **Fondaparinux** for 3 months due to provoked PE's.

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## Introduction

- Swallow syncope, is a rare type of neurogenic mediated syncope associated with life-threatening bradyarrhythmia and hypotension<sup>1</sup>.
- According to the current literature, most cases of swallow syncope appear in older male adults, and less frequently in adult females and even less so in children<sup>3</sup>.
- Current understanding is that it is a dysfunction of the vagal nerve that regulates the heart, which causes arrhythmia when swallowing.
- The esophagus and the heart share the same innervation by the Vagus nerve.
- Stretching of the esophagus through the act of swallowing sends afferent signals along the esophageal plexus via the left vagus nerve to the brainstem.
- The efferent impulses from the brainstem may then reach the sinoatrial node via the right Vagus nerve and the atrioventricular node via the left Vagus nerve. These efferent signals may lead to a number of different bradyarrhythmias and temporary reductions in cardiac output<sup>2</sup>.
- As a result of this decrease in cardiac output, there is ultimately a reduction to cerebral hypoperfusion, leading to syncope<sup>4</sup>.
- Functional disorders of the esophagus are a common occurrence in swallow syncope; however, in a significant number of cases, there are no underlying pathologies described as causative<sup>5</sup>.

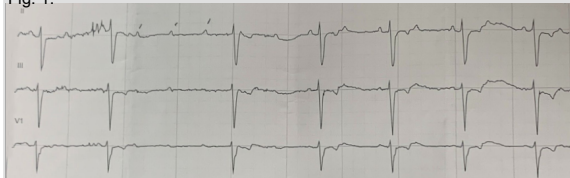
## Case Study

- A 68-year-old black female was brought to the emergency room with complaints of worsening long-term intermittent lightheadedness and dizziness.
- She reported that the day prior to admission, she had a complete loss of consciousness after swallowing a pickle, which was witnessed by family. The loss of consciousness lasted until paramedics arrived without any postictal period.
- The patient had a history significant for coronary artery disease with percutaneous interventions years 1, 3, 5 and 8 prior, and subsequently: no obstruction, residual left circumflex disease, blockage first obtuse marginal artery, blockage to apical left anterior descending artery, and blockage to distal left anterior descending artery, resulting in three stents.
- The patient had a recent transient ischemic attack two months prior with left-sided weakness, which had completely resolved. She also had a history of a neuroendocrine tumor of the terminal ileum with resection seven years prior, and a history of breast cancer with resection seven months prior. Other past medical history included: hypertension, diabetes, interstitial lung disease, for which she remains on oxygen, and a recently found thyroid nodule.
- Physical exam and review of systems was mostly unremarkable other than obesity. At the time of assessment, she denied any syncope and lightheadedness.
- EKG, when compared to prior showed an old bifascicular block; x-ray of the chest, which showed interstitial lung markings and calcified nodule; computed tomography of neck soft tissues, which showed bilateral hypodense thyroid nodule and reactive lymph node.
- Significant lab work included: complete blood count and chemistry showed no significant change from baseline; three troponin I, each of which were negative; brain natriuretic peptide of 136pg/ml; thyroid stimulating hormone of 2.2 uIU/ml; A1c 8.3%; and chromogranin significantly elevated to 1220 ng/ml from baseline (90 ng/ml) post-surgical resection.
- After the initial electrocardiogram, the patient was monitored overnight while on telemetry.
- Telemetry only alerted for bradycardia in the night. Only when the strip was personally examined, it was noted to have a high-degree AV block (Fig. 1). These changes corresponded to around dinner time in the hospital. The patient confirmed that at this time she was eating and stated that she had a brief episode of lightheadedness.

## Cont.

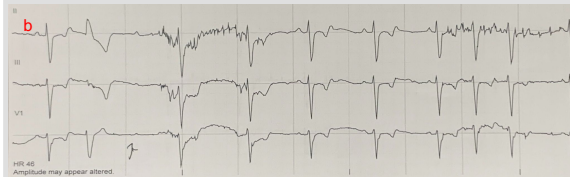
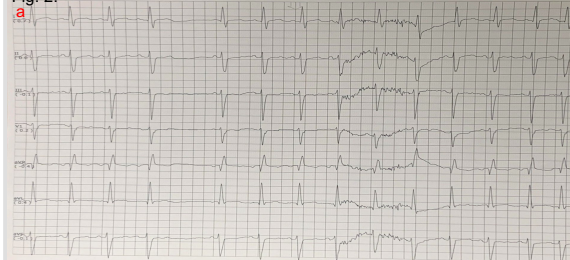
- A repeat EKG was then obtained in the morning.
- Repeat electrocardiography shows baseline EKG with increased P-R intervals at two points. Beta blocker medications were subsequently discontinued.
- On further clarification, the worsening long-term intermittent lightheadedness and dizziness, was also associated with swallowing. Her symptoms of lightheadedness and dizziness were almost always associated with swallowing and were usually resolved within an hour after swallowing. She was unsure of the duration of swallowing difficulties, only stating that it had been "multiple years." She stated that she had been cutting her food into very small pieces to prevent the syncopal episodes.
- Provocative testing by requesting the patient to drink cold water, while under tele-monitoring, was attempted to confirm a possible diagnosis of swallow syncope (Fig 2).
- The patient also reported dizziness and light-headedness immediately after swallowing the cold water. Positive demonstration of a temporal relationship between swallowing, symptoms of light-headedness, dizziness, and electrocardiogram changes were confirmed. A diagnosis of swallow syncope was given. Electrophysiology consulted and the patient was given a permanent pacemaker DDDr type. The patient had complete resolution of all symptomologies.

Fig. 1.



High-degree AV block with three consecutive blocked P waves.

Fig. 2.



a Sinus pause soon after the initiation of drinking cold water.

b AV block a few seconds after swallowing cold water.

## Timeline of Events

- Patient presents to Emergency Department for syncope like episode.
- Admitted to hospital, no absolute causative factors found initially; under observation.
- While on telemetry high degree AV block was seen associated with patient's mealtime. (Fig. 1)
- Clarification of patient's symptoms reveal temporal relation of syncope with swallowing.
- Provocative testing demonstrated temporal relation of heart block with swallowing. (Fig. 2)
- Diagnosis confirmed, pacemaker placed.
- Patient has complete resolution of symptoms.

## Discussion

- Although rare, swallow syncope should be considered as a potential diagnosis.
- History is especially important in demonstrating a temporal relationship with this diagnosis.
- Provocative testing, having the patient swallow while observing telemetry, can establish the diagnosis<sup>8</sup>.
- A baseline electrocardiogram and echocardiogram might help to exclude an underlying cardiac pathology.
- An esophagogastroscopy or barium study can be ordered to detect an underlying disease of the esophagus; however, the absence of pathology does not necessarily rule out the diagnosis<sup>8</sup>.
- Diet changes, such as avoiding carbonated fluids and, excessively hot or cold liquids, reduced stimulation of the esophagus, suggesting that correction of eating habits may be all that is necessary for treatment in some cases<sup>12</sup>.
- Pharmacological intervention alone is typically unsuccessful<sup>10,11</sup>.
- Withdrawal of all medications that may cause a delay in cardiac conduction and inappropriate vasodepression should be initiated initially.
- Permanent pacemaker implantation is generally the first-line treatment and curative<sup>9</sup>.

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**A FOCUSED CASE SERIES**



Louisiana  
Chapter

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Disclosures: The authors have no relevant financial relationships to disclose.

**Introduction**

❖ Recovery from gunshot wounds (GSW) are often complicated by various infectious sequelae involving a broad spectrum of organisms. However, current guidelines on the risk stratification and management of post-GSW infections are lacking.

**Methods**

❖ This is a case series studying patients who suffered post-GSW infections at either acute or chronic phases of their clinical course.

Results:	Total Patients (N=25)
Male	23 (92%)
African American	18 (72%)
Mean Age	41 years
BMI	25 kg/m <sup>2</sup>
Most Common GSW Location	Abdomen, 16 (64%)
Most Common Abx (Prophylaxis)	Cefazolin/Cefoxitin, 16 (64%)
Average Duration to Infection	5.9 days
Most Common Infection Type	8 (32%)
Most Common Abx (Treatment)	Vancomycin + Zosyn, 6 (24%)
Average Duration to Discharge	24.9 days

**Conclusion**

Post-GSW infections are common and can involve highly varied presentations in different organ systems. Importantly, such complications arise at either acute or chronic phases of patients’ recovery course. Larger prospective studies are needed to refine risk stratification and help clinicians better prevent permanent infectious sequelae or disabilities in these patients.

**A CASE COMPARISON**

Yichi Zhang, B.S.<sup>1</sup>; Madison Bangert, M.D.<sup>1</sup>, Magnus Chun, B.S.<sup>1</sup>, Travis Mattingly, M.D.<sup>1</sup>, Crystal Zheng, M.D.<sup>1</sup>

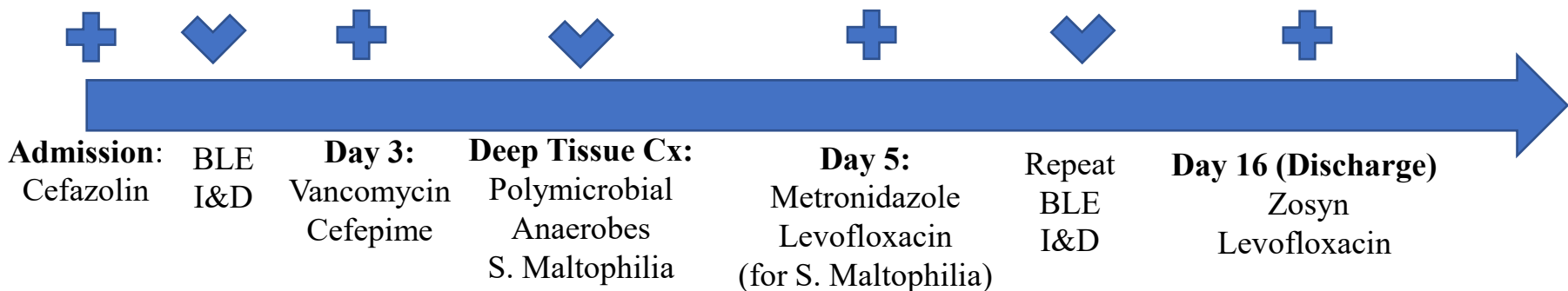
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Disclosures: The authors have no relevant financial relationships to disclose.

**Introduction**

- ❖ Gunshot wounds (GSWs) can precipitate a variety of acute and/or chronic infectious complications across different organ systems and can involve a wide range of organisms. However, current evidence and guidelines on this topic are lacking. Here, we present two young patients with drastically different clinical courses of post-GSW infections to highlight the need for further research in this overlooked intersection of trauma and infectious disease.

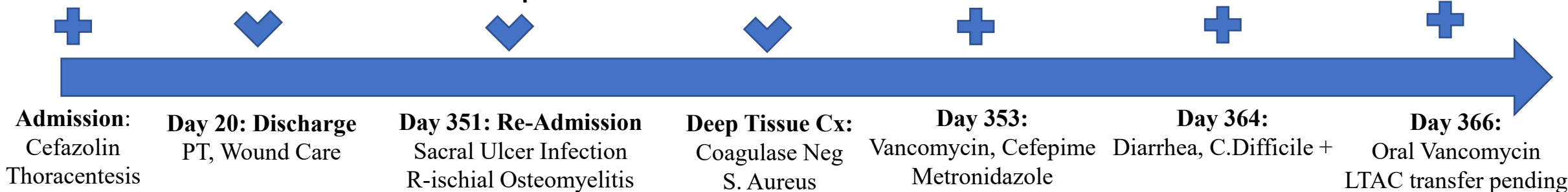
**Case #1: 20M with BLE GSWs complicated by R-tibia and L-fibula open fractures**



**Conclusion**

- Similar Initial Presentations, Drastically Different Sequela
- Need for evidence-based risk stratification and personalized strategies

**Case #1: 25M with GSW to R-ankle and thoracic spine**





**Esophageal Kaposi Sarcoma, Immune Thrombocytopenia, And Uremia-Induced Platelet Dysfunction**

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Disclosures: The authors have no relevant financial relationships to disclose.

**Introduction**

HIV can cause a wide range of systemic sequelae and complicate patients' hospital course in unexpected ways. Here, we present a case of newly diagnosed HIV leading to various infectious and autoimmune conditions that all contributed to dangerous gastrointestinal hemorrhage.

**Case Presentation**

46M presents with chronic cough x1yr with worsening SOB and new hemoptysis. Exam showed umbilicated, bleeding facial lesions. HIV found + and CD4 count was 0.1. Chest CT showed R-perihilar consolidation. CSF and skin lesion biopsy was + for cryptococcus, started on amphotericin. Subsequently, creatinine up to 9.7 and UA showed muddy casts. Hemoptysis worsened, hemoglobin down to 6.3, platelets down to 95, transfusion started, and endoscopy planned.

**Esophageal Kaposi Sarcoma**

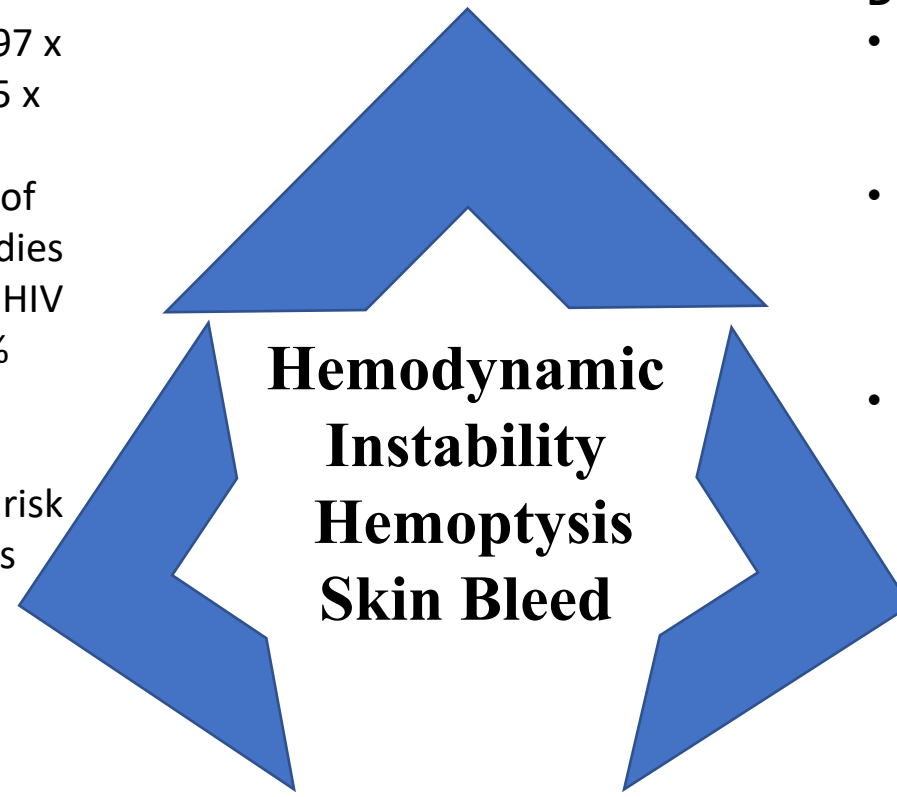
- Upper GI Endoscopy: Vascularized, friable esophageal mucosa
- Prevalence among HIV patients: 1-4%
- Skin and oral mucosa involvement is most common, distal GI involvement is more insidious

**HIV-related Immune Thrombocytopenia**

- Platelet baseline 297 x 10<sup>9</sup>/L, down to 95 x 10<sup>9</sup>/L
- Due to production of antiplatelet antibodies
- Prevalence among HIV patients: up to 30%
- Hinders primary hemostasis and increases bleeding risk due to other causes

**Uremia-induced Platelet Dysfunction**

- Amphotericin-induced nephrotoxicity causes urea spike
- Impairs platelet activation and platelet adhesion to vascular endothelium
- Common due to nephrotoxic potential of medications that treat HIV an HIV-related infections



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**Introduction**

Ferritin and total iron binding capacity (TIBC) are both crucial parts of the iron study used to ascertain the cause of anemia. Under most circumstances, ferritin and TIBC correlate inversely with one another, owing to their physiological significance. Here, we present a case of anemia where this rule was broken under a unique set of coexisting conditions.

**Case Presentation**

45F with PMH of IVDU and MRSA skin lesions presents with stabbing chest pain, cough, fevers, and fatigue x3d. A chest CT showed a 4.7x3.6cm lung mass in the right upper lobe with central cavitation. Her WBC was 7.6 and hemoglobin was 8.8. Sputum AFB smear, tuberculosis PCR test, and Fungicell screen were negative. Transthoracic echocardiogram revealed no valvular vegetations. Broad spectrum coverage was started due to concern for lung abscess. An iron study was performed to investigate anemia and anemia-associated symptoms.

Study Result	Value
Mean Corpuscular Volume	56.7 fL (Low)
RBC Distribution Width	21.1% (High)
Ferritin	415 ug/L (High)
Total Iron Binding Capacity	523 ug/L (High)
Serum Iron	22 umol/L (Low)
Iron Saturation	4% (Low)
Hemoglobin Electrophoresis	95.2% HbA1, 4.8% HbA2

**Discussion:**

- ❖ Serum ferritin and TIBC levels typically show an inverse correlation.
- ❖ Iron deficiency anemia:
  - ❖ Low serum iron, saturation and MCV
  - ❖ High TIBC and RDW.
- ❖ Beta-thalassemia minor: Increased HbA2 production.
  - ❖ Low MCV
- ❖ Anemia of chronic disease: High ferritin levels.
- ❖ Ultimately, an interesting trio of clinical conditions resulted in this uniquely paradoxical iron study.

# NEUTROPENIC FEVER AND A NEW SOFT TISSUE MASS IN THE RIGHT UPPER LUNG

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Disclosures: The authors have no relevant financial relationships to disclose.



## Case Presentation:

- ❖ **Hispanic 46M with PMH of acute myelocytic leukemia (AML) presents with fever of 3-day duration s/p 1-week of induction chemotherapy with fludarabine, cytarabine, filgrastim (FLAG) and venetoclax.**
- ❖ Patient **denies cough, SOB**, diarrhea, abdominal pain, or dysuria.
- ❖ Presenting Vitals: T 37.6, P 87, BP 108/50, SpO2 94% on RA
- ❖ Physical Exam: **Lungs bilaterally clear**, heart sounds were regular rate and rhythm, no gross abnormalities
- ❖ **CXR on admission: Unremarkable.**



Admission	Infectious Workup	Discharge/Disposition	Readmission
WBC: 1700 Absolute Neutrophil Count (ANC): 0~	No Hx of TB 2x AFB smears (-), TB PCR (-)	Discharged on Ppx for Neutropenic Fever: Levofloxacin, Voriconazole, Bactrim	1wk x Persistent fever w/o cough or SOB ANC up to 260
			
Hemoglobin 8.9 Platelets 402 Covid (-) Influenza (-)	Fungitell (-) Galactomannan (-) Blood Cx: (+) for S. Mitis	Linezolid for S. Bovis	CT Chest revealed 2x3cm RUL Lung Mass Bronchoscopy with BAL and PAS/GMS stain (+) for Aspergillus Spp. → surgery planned.

## Discussion:

- ❖ Aspergilloma most commonly arises in pre-existing lung cavities but can develop in immunocompromised patients without history of cavitation.
- ❖ **Atypical features of this case: Lack of respiratory symptoms, CXR (-), Fungitell (-), Galactomannan (-), Blood Cx (-) for fungemia.**
  - ❖ Fungitell test sensitivity for Aspergillus is 80%, Galactomannan test sensitivity for Aspergillus is 71%.
- ❖ **“If it walks like a duck and quacks like a duck, it’s probably a duck!”** -> Always consider aspergillosis in high-risk patients!

# Osmotic Central Pontine Demyelination Syndrome in an Eunatremic Elderly Man

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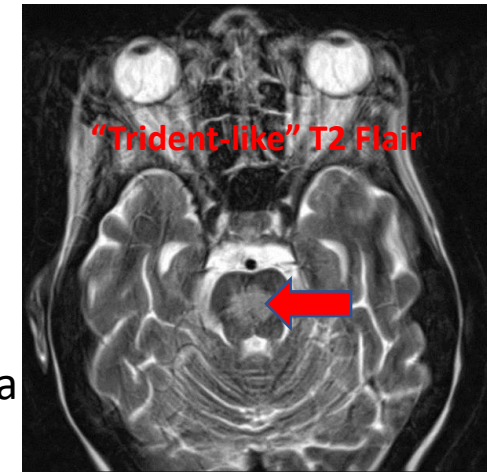
Disclosures: The authors have no relevant financial relationships to disclose.

## 1<sup>st</sup> Admission (Day 0-7):

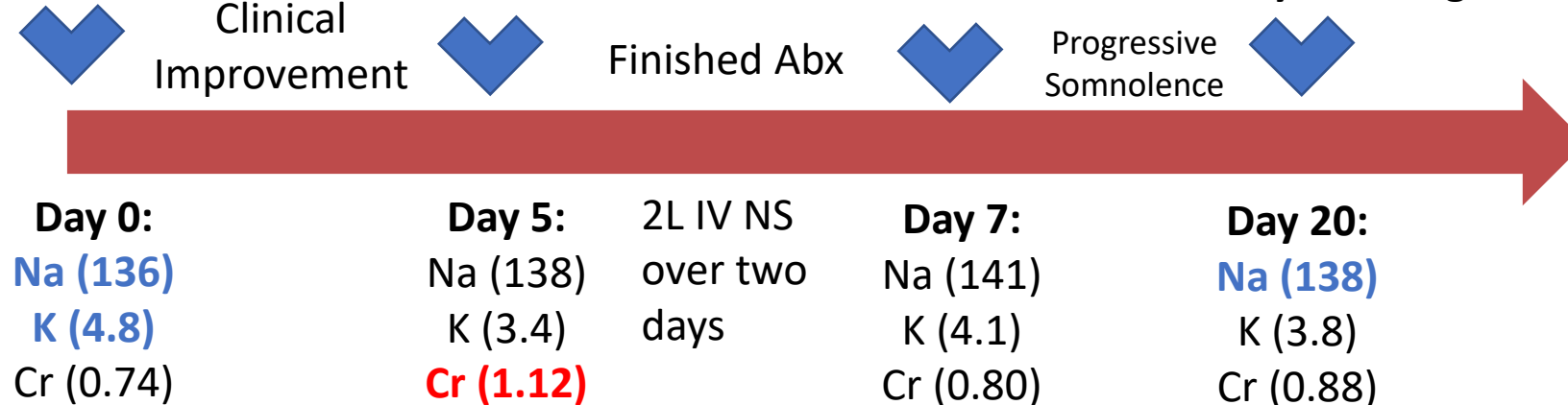
- ❖ Asian, 76M with PMH of HTN, T2DM, and TIA presents with cough, fatigue, and headache of 4-day duration.
  - ❖ Afebrile, Tachypneic to 30, otherwise normal vitals
  - ❖ Physical Exam: R-sided loud inspiratory sounds
  - ❖ CXR showed RML opacity concerning for CAP
    - ❖ IV Ceftriaxone and Azithromycin started
    - ❖ Covid-19 negative, Admitted for monitoring

## 2<sup>nd</sup> Admission (Day 20):

- ❖ Somnolence, slower reaction time. AOx4 but fatigued. Denies dysarthria.
  - ❖ VSS, neuro exam grossly intact
  - ❖ CT Head: Symmetric Atrophy
  - ❖ MRI Head: Pontine Myelinolysis
    - ❖ Eunatremia, relowering of Na not attempted



## Timeline of Events



## ODS:

- ❖ Due to rapid over-repletion of sodium >8mEq/L per 24h in setting of *chronic hyponatremia*
- ❖ Risk factors:
  - ❖ Serum Na<120 mEq/L
  - ❖ Hypokalemia
  - ❖ Liver Disease/EtOH Abuse
  - ❖ Malnutrition
  - ❖ Hx of Brain Hypoxia





# A Case of Warm Autoimmune Hemolytic Anemia

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## Introduction

- Warm autoimmune hemolytic anemia (AIHA) is a rare clinical disease which can manifest as a primary idiopathic disease or secondary to other disorders or medications.
- Autoantibodies bind erythrocytes at body temperature leading to accelerated erythrocyte destruction via primarily extracellular hemolysis.
- Clinical manifestations include anemia-related symptoms such as fatigue, dyspnea on exertion, bounding pulse or palpitations, jaundice or dark urine, splenomegaly, and chest pain.
- Management depends on the severity of the anemia, but can include transfusion, treatment of any underlying disorder, glucocorticoids with or without rituximab, folic acid, and IVIG.

## Case Presentation

- A 68-year-old woman with a past medical history of anemia requiring transfusions, CAD s/p stents in 2007 and 2021, T2DM, HTN, and COVID-19 infection nine months prior presented with chest pain and shortness of breath on exertion for two months.
- She described the pain as central, non-radiating chest tightness associated with dyspnea on exertion, which resolved with a few minutes of rest. She originally attributed this chest pain to her recent cardiac stent.
- Three weeks prior, she was treated for anemia (hemoglobin 5.4 gm/dL) with four units of packed red blood cells. This was her first blood transfusion. Her hemoglobin increased to 7.9 mg/dL after transfusion with temporary improvement of her symptoms until this presentation.
- Admit vitals were BP 154/65, HR 99, RR 20, O2 99% on room air, T 97.9F.
- Physical exam was notable for generalized jaundice and scleral icterus.
- Laboratory results included hemoglobin of 6.5 mg/dL, MCV 106 fL, reticulocyte count 17.3%, peripheral blood smear with polychromatophils, total bilirubin 6.5 mg/dL, direct bilirubin 0.8 mg/dL, lactate dehydrogenase 321 U/L, and haptoglobin <30 mg/dL. Her EKG and troponin were normal.
- Abdominal CT 3 weeks prior to admission and chest CT during admission significant for splenomegaly.

## Image



Table 1: Secondary WAIHA Labs

Lab	Results
EBV VCA	IgG positive, IgM negative
Hepatitis panel	Negative
HIV	Negative
ANA	Negative
Flow cytometry consult	No evidence of B or T lymphoproliferative disorders
Kappa/Lambda Light Chains	Kappa 9.19 mg/L (normal) Lambda 7.61 mg/L (normal) Kappa/Lambda ratio 1.21 (normal)
Urine Free Light Chains	Negative for monoclonal free light chains
Immunoglobulin IgG	323 mg/dL (low)

## Hospital Course

- Workup showed a direct antiglobulin test was positive with anti-IgG and complement C3 antibodies. This result confirmed the diagnosis of warm autoimmune hemolytic anemia. Patient was also positive for anti-E and warm autoantibodies.
- EBV VCA IgG antibodies were also found to be positive, however EBV VCA IgM antibodies were negative, so this is of unclear significance.
- Other work-up for secondary causes did not elucidate cause. See results in Table 1.
- Patient received one unit of packed red blood cells with a subsequent hemoglobin of 6.1 gm/dL.
- She was then started on prednisone monotherapy without initial improvement. Rituximab with prednisone started with an increase in her hemoglobin to 6.9 gm/dL prior to discharge.
- The patient was discharged on high dose prednisone, scheduled for further rituximab infusions and given close follow-up with hematology and PCP.
- Atovaquone was added for pneumocystis jirovecii pneumonia prophylaxis during rituximab and prednisone treatment.
- Patient was monitored for hyperglycemia and required initiating insulin during treatment with prednisone.

## Discussion

- Warm autoimmune hemolytic anemia is the most common type of AIHA, and its incidence is approximately 1-3 people per 100,000 annually.
- It can present with symptoms of chest pain, shortness of breath, and dyspnea on exertion which may at first seem to be cardiac in nature.
- However, further investigation with laboratory workup can reveal underlying hematologic abnormalities which can present similarly with more severe cases of AIHA.
- Approximately 50-60 percent of warm AIHA are associated with underlying conditions including EBV, HIV, HCV, lymphoproliferative disorders, immunodeficiency states, infections, and medications.
- It is important to consider AIHA in anemic patients with immunocompromised conditions. Cases have also been reported of new onset AIHA in association with concurrent or recent COVID-19 infection, although there is no available evidence yet of AIHA occurring several months after resolving COVID-19 infection.

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# AIDS-related Kaposi Sarcoma in Well-Controlled HIV

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## Introduction

- Kaposi Sarcoma (KS) is an angio-proliferative malignancy of endothelial origin often characterized by its spindle cell morphology, expression of CD31 and CD34, and associated chronic inflammatory infiltrate<sup>1,4,2</sup>.
- Pathogenesis of KS relies on latent infection with HHV-8/KSHV coupled with environmental, immunomodulatory, and genetic factors<sup>1,2,8</sup>.
- The incidence of KS in HIV-positive patients has diminished considerably following the advent of anti-retroviral therapy (ART) in the mid-1990s<sup>2,5</sup>.
- We describe an atypical presentation of lymph nodal Kaposi Sarcoma without cutaneous involvement in an HIV-positive male on ART.

## Case Presentation

- A 43-year-old African American male with a past medical history of HIV (diagnosed 15 years prior, well-controlled on bicitegravir-emtricitabine-tenofovir with recent undetectable viral load), rheumatoid arthritis (on indomethacin and hydroxychloroquine), hepatitis C (post-treatment), and diabetes mellitus presented with shoulder, elbow, knee, and foot pain in addition to right knee swelling for 1 week.
- Of note, there was no history of opportunistic infection.
- On review of systems, he endorsed recent subjective fevers, night sweats, and a right inguinal mass.
- Two weeks prior, an outpatient CT Urogram incidentally revealed bilateral inguinal lymphadenopathy with necrotic foci with workup revealing positive T-Spot testing.
- Physical exam at presentation demonstrated right knee tenderness, edema, and limited range of motion concerning for septic arthritis in the setting of an immunosuppressive state. Vital signs were significant for fever and mild tachycardia. No cutaneous lesions were present.
- Laboratory evaluation of HIV status obtained 2 months prior demonstrated medication adherence with a CD4+ count of 1,024 (40.2%), an undetectable viral load, and a CD4+/CD8+ ratio of 1.1.
- At presentation, WBC count, ESR, and CRP were elevated at 16.7, 25, and 24.8, respectively.

## Images

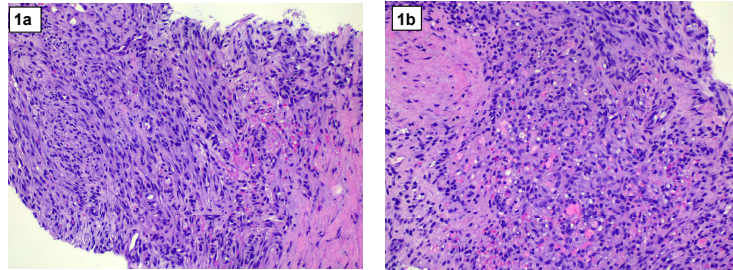


Figure 1a and 1b: Ill-defined fascicular arrangement of spindle cells with extravasated red blood cells.

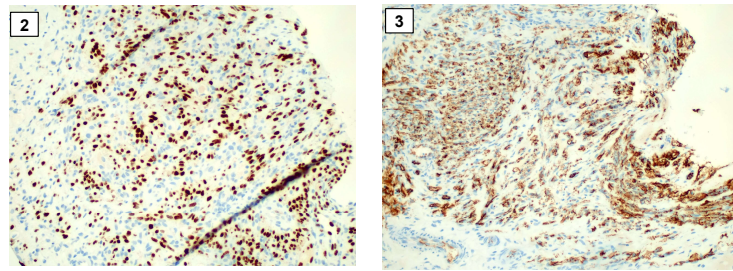


Figure 2: Nuclear expression of HHV8 immunostain.

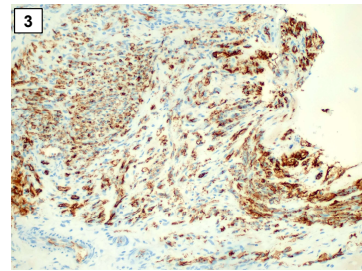


Figure 3: CD34 expression by neoplastic cells

Table 1: Kaposi Sarcoma Staging		
	Good Risk (0)	Poor Risk (1)
Tumor (T)	<u>T0</u> : Confined to skin, and/or lymph nodes, and/or minimal oral disease	<u>T1</u> : Associated edema or ulceration, extensive oral KS, GI KS, or KS in other non-nodal viscera.
Immune System (I)	<u>I0</u> : CD4+ cells ≥200 uL	<u>I1</u> : CD4+ cells <200 uL
Systemic Illness (S)	<u>S0</u> : No history of opportunistic infection or thrush. No B symptoms. Performance status ≥70 (Karnofsky)	<u>S1</u> : History of opportunistic infection or thrush. B symptoms present. Performance status <70 (Karnofsky) Other HIV-related illness.

Table 1. Kaposi Sarcoma Staging. Adapted from Kaposi's sarcoma in the acquired immune deficiency syndrome: a proposal for uniform evaluation, response, and staging criteria, by Krown et al, 1989, AIDS Clinical Trials Group Oncology Committee, Journal of Clinical Oncology



Figure 4: CT Abdomen and Pelvis with contrast showing a right inguinal lymph node with a focus of necrosis and bulky bilateral inguinal lymphadenopathy. Consistent with stage T0, I0, S1 Kaposi Sarcoma.

## Clinical Course

- Following diagnostic arthrocentesis of the right knee, broad spectrum antibiotics were initiated for septic arthritis.
- Right inguinal lymph node biopsy was performed due to concern for latent tuberculosis infection.
- However, biopsy with histopathology revealed a vascularized spindle cell neoplasm expressing HHV-8 and CD34 immunostains, consistent with Kaposi Sarcoma (Fig 1a, 1b, 2, 3).
- Following hospitalization, patient was instructed to follow up with Hematology/ Oncology.
  - At this time, he endorsed continual night sweats with physical examination revealing 2-3 mild violaceous lesions on the buccal mucosa.
  - CT of the abdomen and pelvis revealed Stage T0, I0, S1 Kaposi Sarcoma (Fig 4, Table 1) and thus liposomal doxorubicin therapy was initiated.

## Discussion

- Despite ART, rates of KS are 60 to 80-fold higher in patients with well-controlled HIV versus the general population<sup>6</sup>.
- Immunosenescence has been proposed as one explanation for development of KS in ART treated patients with HIV and is associated with increased immunosenescent T cell populations (CD28, CD57+), diminished naïve T cells, and increased effector T cells<sup>11</sup>.
- CD8+ T cell upregulation is associated with development of KS in ART-treated patients and may represent CD8+ T cell exhaustion, absence of HHV-8 targeted T cell response, and development of Kaposi Sarcoma, even in the setting of well-controlled HIV<sup>6,7,9</sup>.
- If this association exists, aging patient populations on ART could subsequently lead to increasing incidence of KS<sup>10</sup>.

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# Hemodialysis Catheter Associated Deep Vein Thrombosis Complicated by Septic Thrombophlebitis

Justin Anzalone, Third Year Medical Student, Ross University School of Medicine, Mohamed Zakee, Mohamed Jiffry MD, PGY-1 Internal Medicine Resident Physician, Egor Potekin MD, PGY-3 Internal Medicine Resident Physician

## Introduction

- ❖ Catheter related bloodstream infections (CRBSI) lead to increased health care costs, prolonged hospital stays, and increased mortality; consequently, prompt empiric antibiotic therapy is warranted, based on most likely organism, and clinical picture.

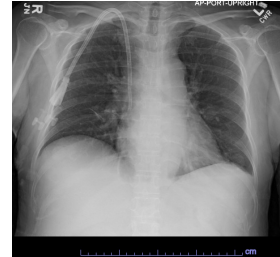
## Case Presentation

- ❖ 54 yo F with past medical history of dialysis-dependent ESRD, ADPKD, and HTN, who presented with a 4-day history of fever, chills, weakness, myalgias, and pain in the RUE.
- ❖ Due to her symptoms, with new onset cough, headache, and neck pain, she presented to the ED.
- ❖ Upon evaluation in the ED she was found to be afebrile, tachycardic at 110bpm, blood pressure 144/75mmhg, respiratory rate of 18bpm, and oxygen saturation of 98% on room air.
- ❖ Chest radiograph (Image A) revealed a right subclavian vein HD catheter.

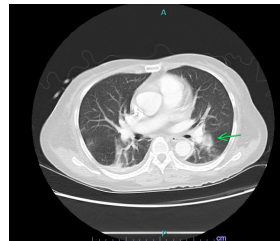
## Hospital Course

- ❖ CT C/A/P w/ contrast demonstrated multifocal areas of ill-defined opacity present within the lung fields, concerning for acute vs. atypical PNA (Image B and C). New small bilateral pleural effusions were present.
- ❖ Vascular RUE duplex ultrasound was positive for DVT involving the right IJ vein (Image D).
- ❖ Initial blood cultures resulted with growth of methicillin sensitive Staphylococcal aureus (MSSA) (Image E) in 4/4 bottles within 24 hours.
- ❖ Right subclavian vascular catheter removed by IR, where they noted purulent drainage upon removal.
- ❖ Catheter tip culture grew MSSA within 48 hours.

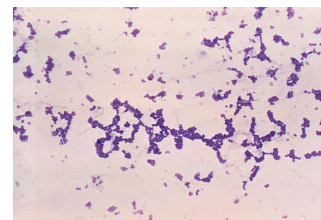
## Imaging



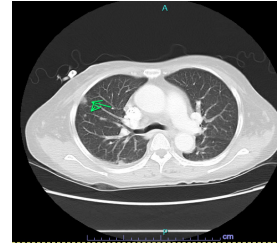
**Image A:** Dual lumen tunneled catheter in the right chest with the tip in the superior vena cava



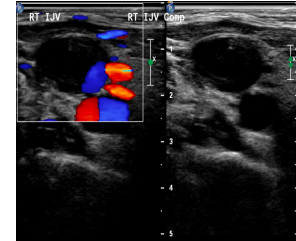
**Image C:** CT Chest w/ multiple ill-defined nodular opacity bilaterally concerning atypical pneumonia. Largest area at left infra-hilar region of the LLL measuring between 2 & 3 cm



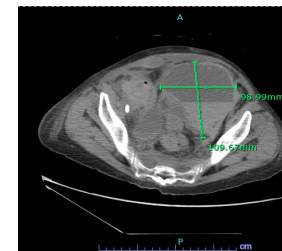
**Image E:** Gram Positive cocci in grape-like clusters



**Image B:** CT Chest w/ multiple ill-defined nodular opacity bilaterally concerning atypical pneumonia



**Image D:** U/S RUE Positive for acute DVT involving the right IJ vein, compression view on the right



**Image F:** Retroperitoneal hematoma noted at the presacral and precoccygeal spaces

## Hospital Course (Cont'd)

- ❖ Vascular surgery placed a temporary right femoral vein hemodialysis access catheter.
- ❖ Transesophageal echo was unrevealing for valve vegetations.
- ❖ Third set of blood cultures showed persistence of MSSA bacteremia on hospital day 5.
- ❖ Right femoral vein HD access catheter was removed due to retroperitoneal bleeding (Image F), and IR placed left IJ vein HD access catheter.
- ❖ Fourth set of blood cultures returned with no growth on hospital day 7.

## Discussion

- ❖ It is estimated that 250,000 bloodstream infections occur annually, with a majority being in the setting of intravascular devices.
- ❖ Tunneled and non-tunneled vascular access catheters are prone to CRBSI, and roughly 40-80% of CRBSIs are caused by gram-positive organisms (coagulase-negative Staphylococci, Staphylococcus aureus, and Enterococcus being the most common). Methicillin-resistant staphylococcus is seen as well. Gram-negatives cause 20-30% of CRBSIs.
- ❖ Our case demonstrates the heterogeneous presentations of CRBSIs and the necessity of maintaining a high index of suspicion for central line infection in the workup of fever.

## References

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