Rare Complication of Ceftriaxone Therapy: Drug Induced Thrombocytopenia (DITP)

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Case Description

- A 62-year-old female with a history of end stage renal disease (ESRD) on hemodialysis, essential hypertension, and type 2 diabetes mellitus presented to our hospital with fever.
- She was tachycardiac, and her labs were significant for leukocytosis and lactic acidosis.
- She was diagnosed with sepsis and started on linezolid 600 mg oral every 12 hrs and 1g ceftriaxone IV every 24 hrs due to her history of infection with vancomycin-resistant enterococci.
- Her transesophageal echocardiogram was negative for endocarditis. Urine cultures grew pansensitive E. coli and K. pneumonia; blood cultures grew Streptococcus dysgalactiae.
- She was switched to ceftriaxone 2 g IV every 24 hrs and discharged on day 8 of antibiotic therapy with a plan to continue them for a total of 2 weeks.
- On day 10, during routine follow up, she was noted to have a platelet count of 34K/µL which further dropped to 5K/µL by day 12 (Figure 1).
- As a result, she was readmitted to the hospital, and ceftriaxone was discontinued the same day.
- Vital signs upon admission were unremarkable (Table 1). No external bleeding, confusion or petechiae were present.
- Her hemoglobin and white blood cell (WBC) count were unchanged with initiation and discontinuation of ceftriaxone (Table 2, Figure 2).
- Infectious disease and hematology were consulted for concerns of drug-induced thrombocytopenia secondary to ceftriaxone. Out of the three cell lines, only her platelet count was suppressed.
- Given the heparin exposure with the antibiotics, heparin platelet factor 4 (PF4) antibody was measured to be elevated at 0.599 (reference range <=0.399). However, serotonin release assay (SRA) was negative and heparin induced thrombocytopenia was ruled out.

Vital Signs	
Temp: 99.2 °F (37.3 °C)	BP: 149/80 mm Hg
Pulse: 85 beats per minute	Respiratory rate: 16 per minute
SpO2: 99% on room air	Weight: 110 kg (242 lbs)

Table 1: Vital signs on readmission to our facility were unremarkable.

Labs

Patient's value	D1	D8	D10	D12	D13	D16	Reference Ranges
WBC	12.7	6.5	4.7	6.1	5.3	5.7	4.0-11.0 K/µL
Hemoglobin	11.1	9.5	9.3	10.0	9.3	9.9	11.5-15.8 g/dL
Platelet Count	143	108	34	5	13	108	140-400 K/µL
Total Bilirubin	0.5			0.5	0.5		0.2-1.2 mg/dL
Creatinine	5.30	3.83	3.85	2.01	2.88	2.76	0.60-1.10 mg/dL
AST	21			20	19		0-35 U/L
ALT	19		30	29	26		0-55 U/L
Alkaline Phosphatase	145			124	116		30-150 U/L

Table 2: Lab work on admission to our facility. The values in red indicate results outside of the corresponding reference range. The empty boxes indicate days when labs weren't drawn. "D1" stands for Day 1, etc. AST stands for aspartate aminotransferase. ALT stands for alanine aminotransferase.

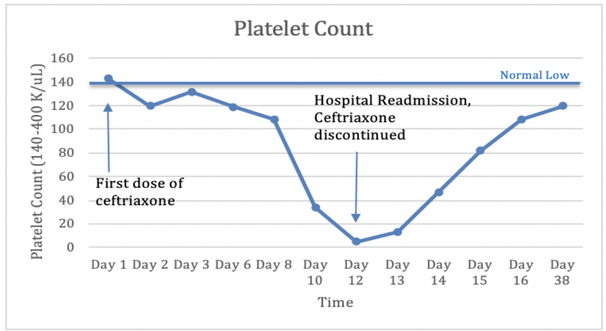

Figure 1: Trend of platelet count during hospital course highlighting causal relationship with the initiation and discontinuation of ceftriaxone.

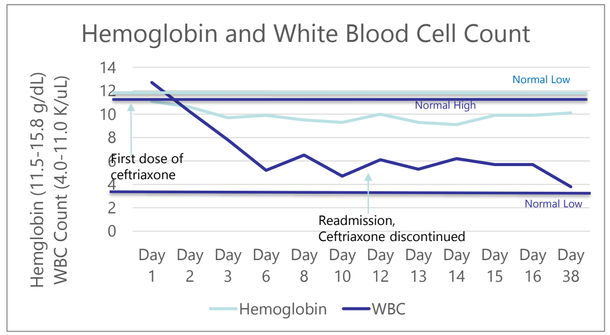

Figure 2: Hemoglobin levels and WBC count remained relatively stable despite initiation and discontinuation of ceftriaxone.

Treatment

- Ceftriaxone was discontinued on arrival and the patient was given vancomycin during the hospital stay per infectious disease recommendation. Her platelets improved to 108K/µL by day 21.
- Given the clinical presentation and temporal relationship of thrombocytopenia in the setting of ceftriaxone without any other identifiable etiologies, a diagnosis of drug-induced thrombocytopenia was made.
- She completed the remainder of her antibiotic course with vancomycin during her hospital stay and was discharged.

Discussion

- Ceftriaxone is a third-generation cephalosporin antibiotic which is widely prescribed due to its broad-spectrum coverage of bacterial infections, convenient dosing, and limited drug-drug interactions that can on rare occasions result in DITP [1].
- Drug-dependent IgG antibodies may target a variety of platelet antigens including surface glycoproteins such as GP Ib/V/IX or GP IIb/IIIa [2].
- Laboratory studies with decreased platelet count and stable hemoglobin and white blood cell count after starting ceftriaxone should raise suspicion for cases of DITP after ruling out HIT following heparin exposure by measuring platelet factor 4 levels [3].
- The preferred treatment of streptococcus bacteremia is IV penicillin G or a third-generation cephalosporin for four to six weeks[4]. Our patient had a penicillin allergy, so ceftriaxone was used instead.
- Timely discontinuation of ceftriaxone is the most important therapy followed by subsequent administration of an appropriate antibiotic such as cefotaxime or vancomycin, as was done with our patient.
- High clinical suspicion in formulating a diagnosis and management of unexplained thrombocytopenia after starting ceftriaxone is imperative.

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Secondary Granulomatous Vasculitis Found Postmortem in Patient with Crohn's Disease

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Learning Objectives:

1. Hypothesis of Crohn's disease pathogenesis and how this relates to granulomatous vasculitis.
2. Histologic evidence of granulomatous inflammation.

Introduction

- Crohn's disease (CD) is a chronic inflammatory disorder of the gastrointestinal tract, oral mucosa, and perianal tissue.
- Non-contiguous granulomatous inflammation is a rare manifestation of CD and typically occurs in the integumentary system.
- Even more rare is secondary granulomatous vasculitis (GV).

Case Description

- A 46-year-old man with a past medical history significant for
  - type 1 diabetes mellitus,
  - primary sclerosing cholangitis,
  - hypothyroidism, and
  - Crohn's disease.
- Was found unresponsive with a .44 caliber revolver adjacent to him and 2 fatal gun shot wounds to the trunk.
- Gross examination during autopsy revealed thickened interventricular septum measuring 20 mm (normal range 5.4-11.8mm).
- Microscopic study of the:
  - lungs showed focal collections of granulomas and giant cells with associated fibrosis and intimal thickening.
  - heart showed chronic inflammatory cells and two vessels of granulomas, giant cells and lymphocytic infiltrate.
  - kidneys revealed partial vessel wall replacement by ill-defined granulomas.
- This was an incidental postmortem finding and is the first documented case of multiorgan secondary granulomatous vasculitis in patient with Crohn's disease.

Pathology

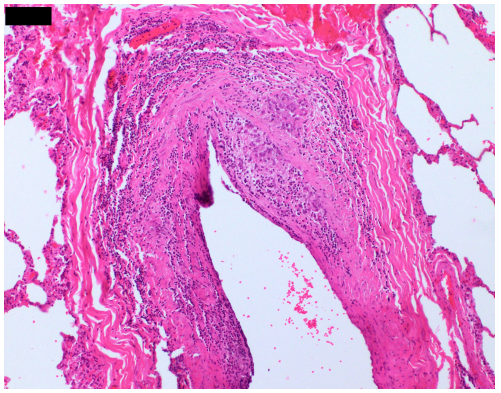

Figure 1

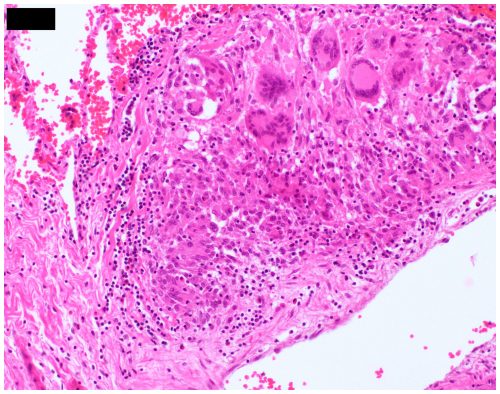

Figure 3

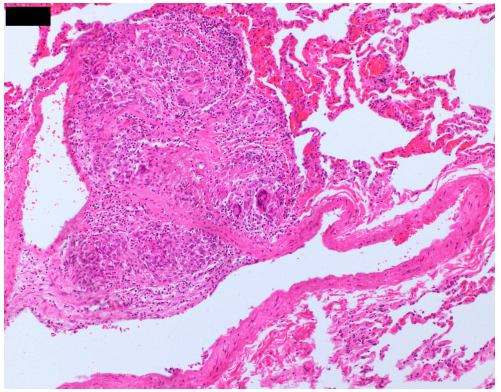

Figure 2

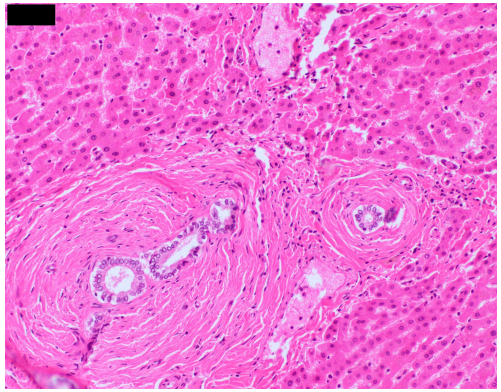

Figure 4

Figure 1: Granulomatous vasculitis. Within the lung is partial involvement and disruption of the vascular wall by granulomatous inflammation (Hematoxylin and eosin, 20x).

Figure 2: Granulomatous vasculitis. The vascular wall of another vessel in the lung has partial involvement and disruption by granulomatous inflammation (Hematoxylin and eosin, 20x).

Figure 3: Granulomatous vasculitis. Granulomatous inflammation of the wall of the vessel. Numerous multi-nucleated giant cells are visible (Hematoxylin and eosin, 40x).

Figure 4: Primary sclerosing cholangitis. At the portal tract are bile ducts rimmed with layers of fibrosis (Hematoxylin and eosin, 20x).

Discussion

- Pathogenesis of granulomatous inflammation is poorly understood. Hypotheses center around a multifactorial immune mechanism that includes
  - altered enzymes
  - genetic factors, and
  - bacterial reactions.
- Altogether this leads to a T-cell hypersensitivity and enhanced interleukin-23 (IL-23) expression and upregulation of IL-23/T-helper cell 17 axis.
- Differential diagnosis in this patient includes:
  - Granulomatosis with polyangiitis
  - Eosinophilic granulomatosis with polyangiitis
  - Polyarteritis nodosa
  - Lymphomatoid granulomatosis
  - Sarcoidosis
- Our patient lacked the predominant features of each of these primary and secondary vasculitis; thus, it is more likely the inflammation found was a secondary manifestation to CD.
- This case is notable because of:
  1. The presence of granulomatous vasculitis in multiple organs.
  2. Inflammation primarily located in venous structures.
  3. Lack of cutaneous involvement.

Conclusion

- This case highlights how extensive vasculitis can be in patients with CD.
- Consideration of screening for granulomatous vasculitis may be beneficial for CD patients experiencing symptoms of heart, lung, or kidney disease.

References

Use the QR code to view all references.

Nivolumab Induced Hypophysitis

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Case Presentation

A 68-year-old man with a past medical history of stage IV RCC, atrial flutter, T2DM, CKD, hypothyroidism on levothyroxine, and long-term opioid therapy presented to the hospital with nausea, vomiting, and altered mental status. He was diagnosed with RCC in 2003 and underwent radical nephrectomy. 10 years later, his RCC relapsed, and he was started on antiangiogenic therapy. Due to adverse events of hypertension induced reversible posterior encephalopathy and fatigue, nivolumab was started in April of 2016. He completed two years of therapy without any substantial adverse events. Approximately one year later, his RCC progressed, and he was restarted on nivolumab + ipilimumab combination therapy. After 2 cycles, he developed autoimmune colitis and was placed on high dose steroids. After a one-week holiday, he was switched to maintenance nivolumab 240 mg IV every 2 weeks for 2 cycles and then the dose was increased to 480 mg every 4 weeks.

After 8 weeks of nivolumab therapy, the patient presented to the hospital with nausea, vomiting and altered mental status. Vitals on admission showed hypotension with systolic blood pressure in the 80s-90s, inadequate elevation of HR with a fully paced rhythm at 70 bpm, and hypoxia on 2 L of O_2. ABGs showed respiratory acidosis with a pH of 7.3 and pCO2 of 48. The patient initially was thought to have overdosed on home narcotics and was started on BiPAP with Narcan administration. Due to an initial response, patient was admitted to ICU with a Narcan drip. In the ICU, the patient's condition was not improving. CT of head, abdomen, and pelvis were within normal limits. Endocrine labs showed secondary adrenal insufficiency, hypogonadotropic hypogonadism, and hypothyroidism (Table 1). MRI did not show a significantly enlarged pituitary and no hyponatremia or hypoglycemia was noted on admission. The patient was started on a stress dose of hydrocortisone and was back to baseline within 24 hours. He was discharged home on hydrocortisone 50 mg twice a day, Levothyroxine 137 mcg, and monthly testosterone injections. The patient survived for an additional 13 months, never restarted RCC therapy and never regained function of his adrenal axis.

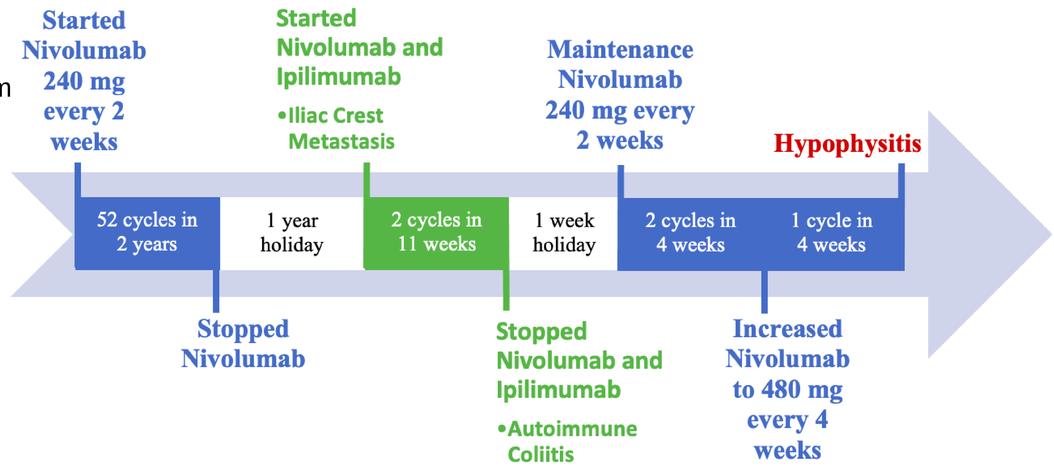

Figure 1: Timeline of Case Presentation

Lab	Value	Reference
ACTH	< 5 pg/ml (L)	
AM Cortisol	< 1 mcg/dL (L)	5 – 22 mcg/dL
FSH	0.3 mIU/ml (L)	1 – 12 mIU/ml
LH	0.1 mIU/ml (L)	0.6 – 12 mIU/ml
TSH	0.3 uIU/ml (L)	0.4 – 5 uIU/ml
Free T4	1.2 ng/dL	0.7 – 1.5 ng/dL
Creatinine	3.3 mg/dL (H)	0.6 – 1.2 mg/dL

Table 1: Pertinent labs on admission

Discussion

Renal cell carcinoma (RCC) makes up 80-85% of primary renal neoplasms and one out of every five cases presents with advanced or metastatic disease.[1] In recent years, the introduction of immune checkpoint inhibitors (ICPI), like nivolumab, has improved overall survival (OS) and progression-free survival (PFS) of cancer patients.[2] However, immune-related toxicities (irAE) are common among ICPIs and some, like hypophysitis, may be difficult to diagnose.

In our case, the patient's multiple co-morbidities interfered with the diagnosis of endocrine dysfunction. The patient's history of chronic opioid use for bone cancer pain and his respiratory acidosis on presentation initially lead the care team to believe he was suffering from an opioid overdose. He also did not have hypoglycemia on admission which can be a helpful sign of secondary adrenal insufficiency.[3-4] This was most likely preserved because of our patient's history of type II diabetes mellitus. Additionally, he already had hypothyroidism and was on levothyroxine replacement making his T4 levels normal despite a low TSH. Lastly, he did not have hyponatremia, a common finding among ICPI induced hypophysitis.[5-6] These nuanced findings confirm that hypophysitis can have a broad presentation that can differ among patients based on their previous co-morbidities

Additionally, this cased showed an unusually early onset of hypophysitis after only 8 weeks from starting nivolumab.[7-8] Some variables that could have contributed to this presentation was the recent increase from 240 mg IV every 2 weeks to 480 mg IV every 4 weeks. Ipilimumab, a different ICPI used for RCC, is known to have a dose-dependent effect on the risk of developing irAEs like hypophysitis.[9] However, a difference in hypophysitis incidence has not yet been studied between different doses of nivolumab.

Conclusion

Immune-related adverse events from nivolumab have a variable time to onset ranging from less than 10 weeks to over a year after first administration. Hypophysitis with secondary adrenal insufficiency can also present without hypoglycemia or hyponatremia making the primary symptoms of presentation hypotension and altered mental status. Lastly, particular attention must be made to previous co-morbidities and how that can alter a patient's presentation on admission.

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Fatal Case of Necrotizing Fasciitis with *Clostridium septicum* as a Complication of Treatment for Breast Cancer

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Introduction

Neutropenic fever is a common complication of chemotherapy for solid organ tumors.

- For breast cancer patients, approximately **16.7% develop febrile neutropenia**. [1]

Outcomes for neutropenic fever related complication are generally positive, with a **mortality rate of 9.5%** in breast cancer patients. [2]

Providers need to appreciate the **urgency** of recognizing the symptoms of neutropenic fever.

Clostridium septicum gas gangrene is classically associated with **undiagnosed colon cancer.**

- Clinical manifestation of gas gangrene is highlighted by the abrupt onset of severe muscle pain.
- Treatment consists of early surgical debridement and antibiotic therapy.

We describe an extremely rare case of fatal neutropenic fever secondary to *Clostridium septicum* induced necrotizing fasciitis in a patient undergoing cancer chemotherapy for a solid organ tumor.

Case Description

The patient was a **49-year-old female** diagnosed with **triple negative breast cancer** 5 months prior to death.

Breast cancer diagnosis (4/23), **1st chemotherapy cycle** (5/7)

↓

Telephone visit with oncology for **mouth soreness**, prescribed nystatin (6/3)

↓

Admitted to ICU from ER with 10/10 pain in lower limbs, lactic acidosis, and kidney injury (6/5)

↓

Overnight, patient **developed worsening erythema over upper thighs** prompting CT. Imaging revealed presence **of gas in musculature** (Fig. 1)**.** (6/6)

↓

Irrigation and debridement to remove necrotic tissue in **five separate procedures**. Tissue biopsy was **positive for Clostridium septicum**. (6/7 – 6/18)

↓

Three more I&D procedures performed, with the last requiring excision of deep thigh muscles. **No GI metastasis detected** on colonoscopy. (6/30 – 7/28)

↓

Patient was transferred **to Long Term Acute Care**. The **infection persisted** requiring further surgical intervention and antimicrobials. She succumbed to the illness after an acute cardiac event (8/20).

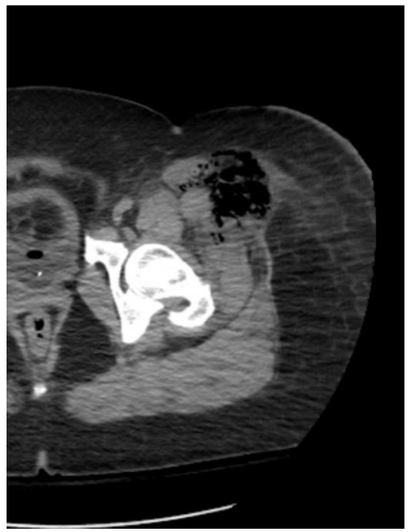

Fig. 1: CT showing necrotizing fasciitis

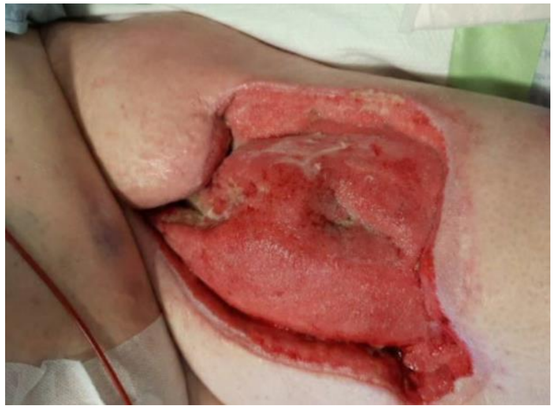

Fig. 2: Postoperative wound

Discussion

Necrotizing fasciitis with Clostridium septicum is an **extremely rare complication** of treatment for solid organ tumors.

The American Society of Clinical Oncology recommends the **administration of empiric antibacterial therapy within 60 minutes of presentation** in all patients with neutropenic fever. [3]

- Each hour delay in time to empiric antibacterial administration in febrile neutropenic patients increased 28 day mortality by 18%. [4]

Prompt management with broad spectrum antibiotics and surgical interventions are **crucial to survival** of patients with signs of necrotizing fasciitis.

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Olecranon Pressure Ulcer in a Quadriplegic Veteran

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A Rare Pressure Ulcer

- 43-year-old male veteran with history of spinal cord injury after MVA in 2015.
- Tetraplegia; wheelchair-bound for 6 years.
- PMH: autonomic dysfunction, indwelling suprapubic catheter.
- **February 2020**: Stage 3 full thickness pressure ulcer over right olecranon (3 cm x 3.75 cm).
- Serosanguinous exudate, no signs of infection, peri-wound skin was healthy and intact.
- Nushield dressing changed every 2 weeks
- Ulcer closed 5 months later.
- Surgery did not recommend skin grafting
- **February 2021**: ulcer reopened (2 cm x 2.5 cm)
- Remained open 1 month later during current hospitalization for a SPC-related UTI.
- 0.5 cm x 0.5 cm. Beefy red wound bottom with surrounding erythema and irritation; no other signs of infection.
- 1-week follow-up with outpatient wound clinic for further management

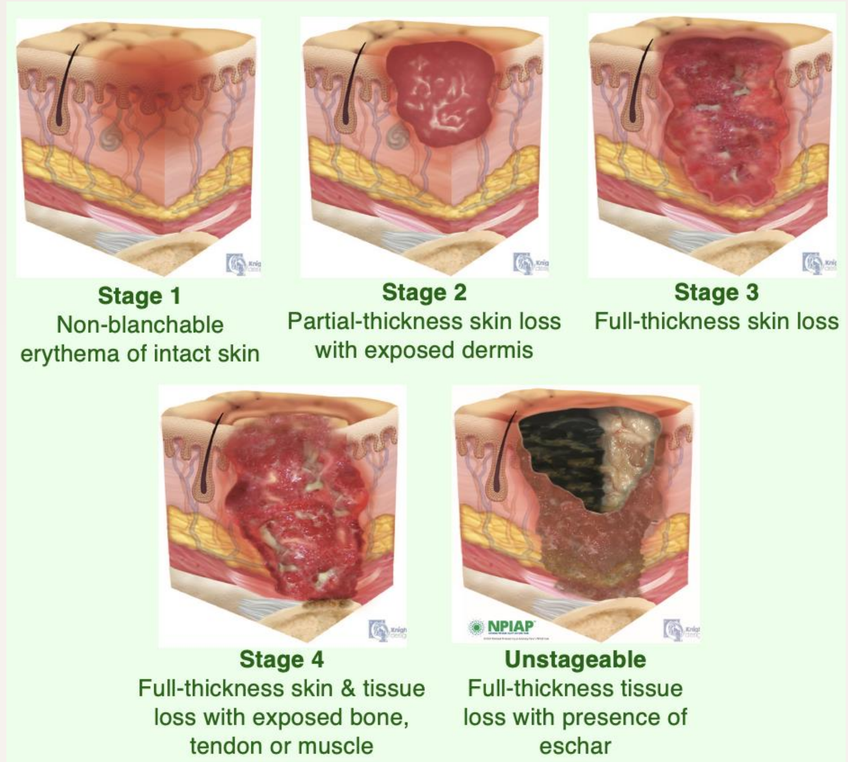

Figure 1: National Pressure Ulcer Advisory Panel Staging, 2016

Background:

- Pressure ulcers: lesions over bony prominences caused by unrelieved pressure resulting in damage to underlying tissue
- Most common sites in adults: sacrum/coccyx, heels, and ears. Infants and younger children: occipital.
- The National Pressure Ulcer Advisory Panel (NPUAP) revised the staging of pressure injury in 2016 (Figure 1)
- Stage I and II are most common, at 48% and 36.1% of all pressure ulcers
- Management: optimize nutritional status, reposition, utilize specialized support surfaces (Figure 2), prophylactic dressings, and surgical closure

Figure 2: Waffle Cushion

Figure 3: Wheelchair in Tilt

Conclusion/Discussion:

- Young victims of MVAs experience life-changing comorbidities
- Complications requiring hospitalizations contribute to poor quality of life
- Unique pressure ulcers develop in unusual locations
- Wound care and plastic surgery play vital roles in management.
- Other than immobilization, he does not have risk factors for poor wound healing - older age, diabetes, immunosuppression, smoking or poor nutritional status
- Power wheelchairs (Figure 3) are essential for mobility, participation in social events, and quality of life in tetraplegic patients.
- Reliance on others for repositioning, minimal elbow support & patient preference for the tilted positioning are all major contributors to this patient's recurrent elbow ulcer

Disclaimer:

- This material is the result of work supported with resources and the use of facilities at the Fargo VA Health Care System. The contents do not represent the views of the U.S. Department of Veterans Affairs or the United States Government.

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Image Credits:

- Fig 1: National Pressure Injury Advisory Panel September 2016 www.npiap.com
- Fig 2: https://www.ehob.com/media/patienteducationcard-cushionvalve-indd.pdf
- Fig 3: https://www.quantumrehab.com/quantum-seating-and-positioning-systems/tru-balance-3.asp

A Rare Case of West Nile Virus-associated Cardiomyopathy

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Introduction:

- West Nile virus: mosquito-borne member of *Flaviviridae* family; endemic to US, Europe, Africa, Middle East, South Asia
- Mild flulike illness in humans
- Infrequently progresses to neuroinvasive disease
- Myocarditis is a very rare complication, however WNV-associated cardiomyopathy has not been well-documented

Case Presentation:

- 68-year-old immunocompromised Caucasian male with 3 days of fever, myalgias, generalized weakness, dizziness, headache; recent travel to Alaska; tick exposure
- PMH significant for RA, diastolic CHF
- 101.6 F, tachycardic, tachypneic. Initial workup **(Table 1)**.
- Fevers on vancomycin & cefepime; extensive workup by Infectious Disease **(Table 2)**. Vancomycin discontinued & initiated doxycycline.
- SOB & central chest discomfort; mildly elevated troponin **(Table 3)** but EKG noncontributory. Echo: new wall motion abnormalities compared to 2 months prior; EF decreased from 55% to 40%. Responded well to diuretic therapy.
- 7-day course of doxycycline & 10-day course of cefepime
- Near end of treatment regimen, results for West Nile IgM antibodies returned positive
- Repeat Echo: EF returned to baseline of 55%. No pericardial effusion. Improved regional wall motion abnormalities.

Laboratory Tests:

Table 1: Initial Labs	**Lab Value** (Reference Range)
SARS-CoV-2 rRT-PCRR	**Negative** (Negative)
Influenza A/B	**Negative** (Negative)
Anaplasma/Ehrlichia Blood Smear	**None Seen** (None Seen)
Anaplasma/Ehrlichia PCR	**Negative** (Negative)
Lyme Disease	**Nonreactive** (Nonreactive)

Table 2: Further Workup	**Lab Value** (Reference Range)
Babesia microti IgG and IgM	**<1:64 and <1:20** (<1:64 IgG & <1:20 IgM)
Bartonella henselae IgG and IgM	**<1:128 and <1:20** (<1:128 IgG & <1:20 IgM)
Coxiella (Q fever) IgG and IgM	**<1:16** (<1:16)
Brucella Abortus IgG & IgM	**Negative** (Negative)
Legionella Antigen Urine	**Presumptive Negative** (Presumptive Negative)
Cytomegalovirus IgG and IgM	**Negative** (Negative)
Aspergillus Antibody	**Negative** (Negative)
Blastomyces Antibody	**Negative** (Negative)
Coccidioides Antibody	**Negative** (Negative)
Histoplasma Antibody	**Negative** (Negative)

Table 3: Subsequent Labs	**Lab Value** (Reference Range)
Troponin Trend	**0.045, 0.048, 0.042** (0.000 – 0.033)
BNP	**333** (0-100 pg/mL)
West Nile IgM	**Positive** (Negative)

Discussion:

- Very few cases of WNV-associated myocarditis reported; 1 case of significant cardiomyopathy
- Highly suspicious for WNV-associated cardiomyopathy causing a transient drop in ejection fraction
- Older age, hematological malignancies & immunosuppression are risk factors
- Unclear if cardiac manifestations are immune response to WNV infection or sequelae of viral infiltration of cardiac myocytes
- Current standard of care: supportive management of fluid balance, antiemetics, analgesics

Conclusion:

- In patients with WNV-associated myocarditis, always consider progression to cardiomyopathy
- Echocardiogram to check ejection fraction is a useful diagnostic tool in these patients

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A Tale of two triggers: Giant cell arteritis leading to monocular blindness in the setting of recent COVID-19 vaccination and CSF positive for HSV

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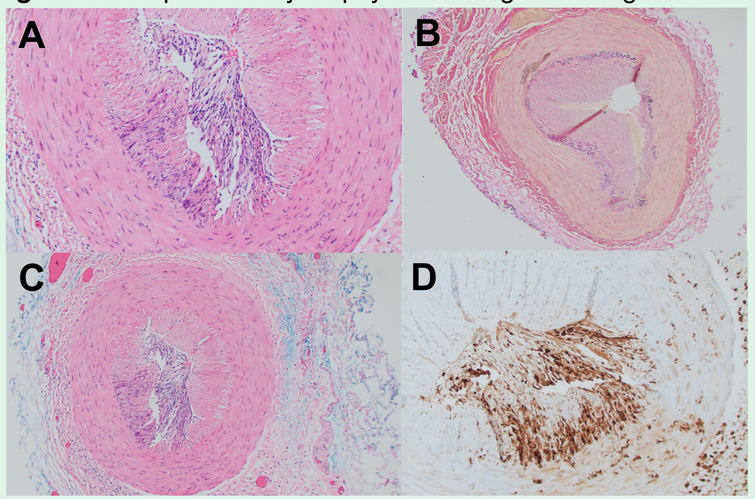
Background

- Giant cell arteritis (GCA) classically presents as unilateral headaches in older adults, but atypical presentations may lead to delayed diagnosis and serious complications like vision loss.[1]
- Reports suggest that certain infections and vaccines may trigger GCA, particularly herpes simplex virus (HSV), influenza, varicella zoster virus (VZV), and COVID-19.
- This is a patient with biopsy-proven GCA with cerebrospinal fluid (CSF) positive for HSV2 after recent COVID-19 vaccination.

Case Description

- A 59-year-old woman presented to the emergency department (ED) for progressive headaches, myalgias, and fever ten days after her first dose of the Moderna COVID-19 vaccination. Work up was unremarkable. She was treated with pain medication for an immunization reaction and discharged.
- 3 days later, she returned to the ED for worsening symptoms, bilateral jaw pain, sore throat, and neck pain. Labs showed WBC 12, CRP 218, ferritin 531, and procalcitonin 0.14. CT head and neck was negative for abscess. She was discharged with hydrocodone and a short course of prednisone for jaw pain of unclear etiology and adverse vaccine reaction.
- One week later, she had acute left monocular vision loss, right-sided weakness, and fall. CRP was 149, ESR 75. Brain MRI revealed an acute left thalamic infarct. She was treated with clopidogrel and aspirin and admitted to the hospital.
- CSF analysis yielded conflicting results with one test HSV2 positive and encephalitis panel HSV2 negative.
- Ophthalmologic exam was normal in the right eye but revealed left relative afferent pupillary defect (RAPD), left peripheral visual field, and left papilledema – findings concerning for GCA.
- Acyclovir and steroids were started. Inflammatory markers, pain and weakness improved, but vision loss did not recover. She was discharged with oral prednisone and rheumatology follow-up.
- Temporal artery biopsy with elastin and CD68 positive immunostaining confirmed GCA diagnosis.

Figure 1: Temporal artery biopsy confirming GCA diagnosis.



Temporal artery biopsy showing giant cell granulomas, multinucleated giant cells and lymphocytic inflammation (A and C) with positive Elastin (B) and CD68 (D) immunostaining.

Discussion

- This is a complex case of GCA with irreversible monocular vision loss and HSV2 encephalitis shortly after mRNA COVID-19 vaccination in a previously healthy woman.
- The pathogenesis of GCA is not fully understood. Seasonal variability and cyclic patterns have implicated a possible infectious trigger in GCA cases.[2]
- Several studies of GCA-positive TAB specimens showed evidence of concurrent viral infections, particularly herpes simplex virus (HSV) or varicella zoster (VZV).[2–4] But, these findings have lacked consistent repeatability.[5,6]
- There are reports of increased rates of GCA and related ophthalmic complications during the COVID-19 pandemic.[7–9] An Italian medical center saw a 70% increase in GCA cases from 2019 to 2020.[7] Maleki *et al* reported two cases of bilateral vision loss after mRNA COVID-19 vaccination.[10]
- The CDC's Vaccine Adverse Reporting Events System (VAERS) between January 2020 – August 2021 recorded 39 GCA cases occurring after vaccination of any kind. 32 of these occurred after COVID-19 vaccination.[11]
- Influenza and VZV vaccines have been linked to increased incidence of GCA.[12–16] One study found significantly greater incidence of GCA after VZV vaccination (hazard ratio 2.70).[17]
- Naranjo score for probability of adverse drug reaction (ADR) related to COVID-19 vaccination was +2. A lack of conclusive evidence that COVID-19 vaccines cause GCA and a second potential trigger of HSV encephalitis lowered the score.
- Further investigation is needed to clarify the relationship between infectious triggers and GCA. Monitoring patients for rare post-vaccination complications and maintaining a high level of suspicion for GCA with atypical presentations can facilitate early diagnosis, treatment, and prevent morbidity.

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Myocarditis: a rare complication after mRNA COVID-19 Vaccination

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Introduction

- Although rare, vaccination-related myocarditis is increasingly being reported in young adults after COVID-19 vaccination. It often presents with chest pain, elevated troponin, and elevated inflammatory markers.
- These patients have a good prognosis and typically recover with supportive care.

Case Description

- A 27-year-old male presented to the emergency department with sharp, central, non-radiating chest pain, and fatigue, three days after his second dose of the Pfizer-BioNTech COVID-19 vaccine. He denied any fever, chills, diaphoresis, upper or lower respiratory tract symptoms, nausea, vomiting, or diarrhea and did not have any history of acute COVID-19 infection.
- Vital signs were within normal limits, and physical exam was unremarkable. EKG showed normal sinus rhythm without any ST-T changes. Chest X ray showed no acute cardiopulmonary process. The patient was given one dose of Aspirin 325 mg, and the symptoms resolved.
- Laboratory data showed an elevated Troponin I (0.245 ng/ml, normal 0-0.028 ng/ml) and C-reactive protein (44.2 mg/L, normal 0.0-8.0 mg/L). Troponin I peaked (0.391 ng/ml) 6 hours after the initial troponin.
- Echocardiogram showed normal ejection fraction of 60% and no regional wall motion changes or pericardial effusion.
- He was monitored overnight in the hospital. Telemetry showed no arrythmias, and he was discharged home the next day.

Discussion

- A new trend of myocarditis among young adults receiving mRNA COVID-19 vaccines is emerging.[1]
- As of June 19th 2021, the CDC vaccine adverse events reporting system (VAERS) reported 1068 cases of myocarditis after various vaccines since 1991.[1,2] Of these, 778 cases of myocarditis occurred after mRNA COVID-19 vaccination. 72.9% of all reported cases were with Pfizer-BioNTech or Moderna vaccines.[2]
- A news article in the *Times of Israel* first drew alarm to after reporting 62 cases of myocarditis after Pfizer-BioNTech vaccination in Israel.[3]
- Early cases of myocarditis following vaccination were also reported by the US military[4] and in Europe.[5,6]
- The first case published in the medical literature described myocarditis post-COVID-19 vaccination in a 39-year-old man from Europe. He made a good recovery with anti-inflammatory treatment.[5]
- Ammirati *et al* reported a case of myocarditis in a 59-year-old patient who presented after his second dose of vaccination with chest pain, elevated C-reactive protein and troponin and made a spontaneous recovery.[6]
- Seven cases reported by Marshall *et al* were patients between 14-19 years old. All of them had an elevated troponin. Six patients received non-steroidal anti-inflammatory drugs (NSAIDs) and four of them were treated with steroids and IVIG. All of them made a good recovery.[7]
- Abu Mouch *et al* reported six cases in Israelis between 16-45 years old. All had elevated C-reactive protein and troponin levels. They were treated with NSAIDs and colchicine and made a good recovery.[8]
- Literature review showed that post-vaccination myocarditis most often occurred in young adults, within 2-4 days after vaccination, and most improved with conservative management.[7,8]
- Promptly identifying post-vaccination myocarditis is needed to avoid unnecessary and expensive investigation in these patients. A causal association between the mRNA vaccines and myocarditis is unknown. The pathophysiology of this condition is unclear and needs to be further investigated.

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A Rare Case of Non-Cardiogenic Pulmonary Edema Complicating Electroconvulsive Therapy

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Introduction

- Neurogenic pulmonary edema (NPE) is a rare but always life-threatening complication in patients with central nervous system (CNS) insults.
- NPE is characterized by the acute onset of pulmonary edema following a significant CNS insult
- Occurs due to the surge of catecholamines that results in cardiopulmonary dysfunction
- Other causes of the symptoms, such as aspiration of gastric contents, congestive heart failure and direct toxic exposure must be ruled out.

Significance

- Acute pulmonary edema complicating ECT is an infrequent complication rarely reported in the literature.
- To the best of our data, only nine cases have been reported in the literature.
- We present a case of A 41-year-old male with no prior history of cardiopulmonary disease who developed acute hypoxemia requiring intubation and transfer to the intensive care unit (ICU) due to pulmonary edema after his third course of ECT.

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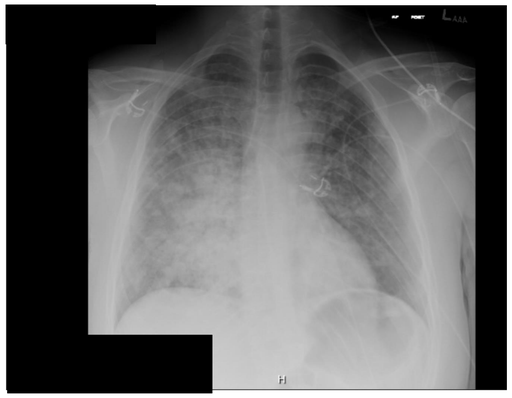
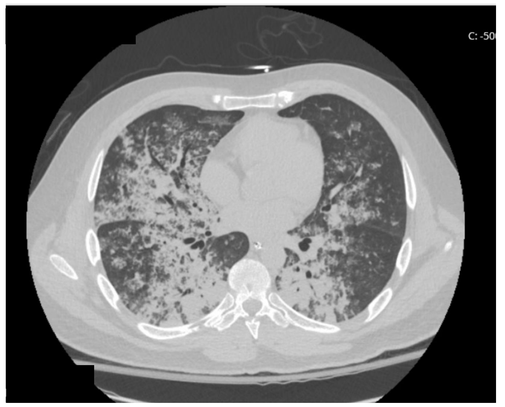
Patient Description

- 41-year-old male with no prior history of cardiopulmonary disease was admitted for Major Depressive Disorder with suicidal ideations.
- After failure of intensive psychotherapy and antidepressant medications, ECT was instituted.
- His medications included Abilify, Wellbutrin and Remeron.
- He underwent his 3rd round of electroconvulsive therapy with IV sedation.
- After completing his ECT session patient had spontaneous respiration and normal awakening
- He developed sinus tachycardia, tachypnea, hypoxia with laborious breathing, and coughing up frothy pink sputum with streaks of blood.
- Due to the persistent hypoxia, the patient was intubated and transferred to the ICU.
- Chest X-ray showed hazy bilateral opacities
- Echocardiogram of the heart, BNP, cardiac enzymes, and EKG were all normal.
- Bronchoscopy revealed bleeding in the airways bilaterally that was pink and frothy and coming from the alveoli
- CT demonstrated prominent bilateral nonspecific pulmonary infiltrates with a central and somewhat nodular pattern.
- He was gradually weaned off mechanical ventilation and extubated without difficulty with the resolution of pulmonary edema.
- Repeat chest imaging showed significant and rapid clearing of bilateral lung opacities
- He was discharged home with outpatient follow-up with Pulmonology.
- Six weeks later, respiratory symptoms had completely resolved, and chest X ray showed complete resolution of previous changes
- Patient is no longer receiving ECT and current Psychiatric management includes Metadate, Abilify, and Wellbutrin

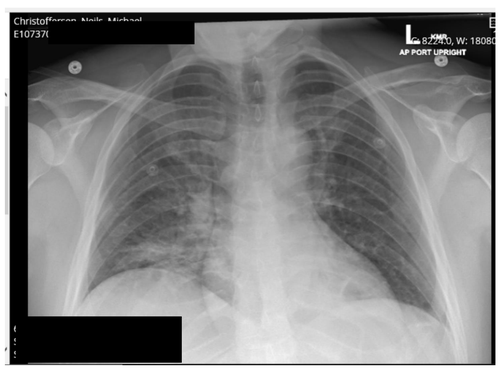
Progression of Pulmonary Edema

Following ECT





Prior to Discharge



Discussion

- This case report describes a presentation of this condition with a review of its possible mechanisms that include negative-pressure pulmonary edema after laryngospasm, cardiogenic pulmonary edema, neurogenic edema, and aspiration.
- Negative-pressure pulmonary edema is due to forced inspiration against a closed glottis during ECT, resulting in negative intrathoracic pressure and enhanced venous return to the thorax causing pulmonary edema. In our case, the manifestations that occurred several minutes after a full recovery make this unlikely.
- A normal cardiac workup, a chest radiograph compatible with ARDS, and a normal BNP level do not support cardiogenic pulmonary edema. The absence of witnessed aspiration rules out aspiration as the likely cause.
- Based on the information mentioned above, clinical presentation, our patient was diagnosed with ECT-induced acute neurogenic pulmonary edema (NPE)
- The seizure-induced during Electroconvulsive therapy may increase the cerebrospinal fluid pressure causing alpha- and beta-adrenergic stimulation leading to the development of neurogenic pulmonary edema with the patients becoming acutely dyspneic, tachypneic, and hypoxic within minutes. Symptoms often spontaneously resolve within 24 to 48 hours.

Conclusions

- Acute pulmonary edema following ECT is an unpredictable and highly uncommon condition that has infrequently been reported previously
- This case illustrates the importance of recognizing this severe but rare complication that can result in severe morbidity and even death if not immediately identified and treated.

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Fatal Case of Liver and Brain Abscesses due to *Fusobacterium nucleatum*

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Introduction

- *Fusobacterium nucleatum* is an anaerobic gram negative organism regarded as an oral commensal
- Fusobacterial pyogenic liver abscesses have been reported in immunocompetent individuals who have been exposed to factors that allow for hematogenous spread such as periodontal disease and pharyngitis
- Here we present the case of an 63-year-old presenting with a right upper quadrant palpable mass found to have *Fusobacterium nucleatum* liver abscess with innumerable intracranial abscesses

Case Description

- A 63-year old male with alcohol and tobacco use disorder presented with generalized weakness and lethargy.
- Table 1 shows initial laboratory findings, which were significant for leukocytosis, elevated inflammatory markers and transaminases
- Physical examination was notable for poor dentition and palpable right upper quadrant mass, and a CT of the abdomen was done with note of the liver abscess in Figure 1
- Drainage of the liver abscess grew *F. nucleatum,* and antibiotic coverage was broadened to metronidazole
- Magnetic resonance imaging (MRI) of the brain was obtained due to progressive encephalopathy, and revealed innumerable ring-enhancing lesions in the cerebral and cerebellar hemispheres
- Maxillofacial CT showed poor dentition with many maxillary and mandibular carious lesions
- Over the course of his hospital stay, the patient developed rapid metabolic encephalopathy and progressive respiratory failure, and expired on day 8 of admission

Table 1: Laboratory findings at admission

	Admission	Reference range
Hemoglobin	14.8	13-15 g/dL
RBC	4.51	4.6-6.8 x 10^6/mcL
WBC	19.3	3.6-10.3 x 10^3/mcL
Platelet	409	140-420 x 10^3/mcL
Absolute neutrophils	16	1.8-8.0 K/uL
Absolute lymphocytes	1.7	0.8-4.1 K/uL
Blood glucose	144	70-100 mg/dL
Sodium	142	135-145 mmol/L
Potassium	4.0	3.7-5.1 mmol/L
Chloride	104	96-110 mmol/L
Bicarbonate	29	22-32 mmol/L
BUN	25	6-24 mg/dL
Creatinine	0.71	0.6-1.3 mg/dL
Calcium	8.7	8.5-10.5 mg/dL
Bilirubin total	2.2	0.2-1.2 mg/dL
ALP	137	30-150 U/L
ALT	252	0-35 U/L
AST	167	0-35 U/L
CRP	116	0.0-8.0 mg/L
Lactic acid	2.3	0.5-2.2 mmol/L

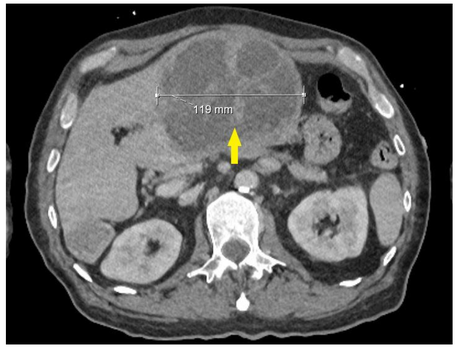

Figure 1. CT abdomen and pelvis showing large multiloculated liver abscess

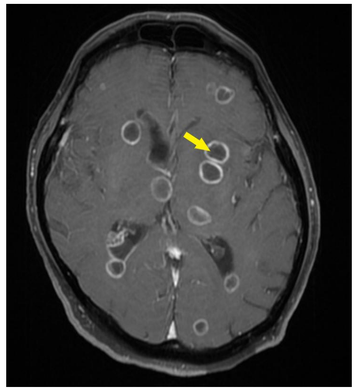

Figure 2. MRI showing innumerable parenchymal brain abscesses

Discussion

- While disseminated *Fusobacterium* infections spreading to the brain, liver, and other organs have been reported, they are not a common occurrence
- Hematogenous spread of *Fusobacterium,* which can lead to hepatic infection, can occur from oral sources such as dental caries or peritonsillar abscesses
- Our patient's physical findings, as well as maxillary imaging, make odontogenic infection the most likely source of his hepatic and cerebral abscesses.
- The sensitivity of blood cultures may be poor in those presenting with abscesses, therefore polymerase chain reaction (PCR) can aid in identifying cases with negative cultures

Conclusion

- It is important to consider *Fusobacterium spp.* infections, especially in patients with odontogenic risk factors, despite the pathogen being a rare cause of liver and intracerebral infections
- Odontogenic infections are predisposing risk factors for *Fusobacterium spp*. infections, even in those with no known immunosuppression
- Prompt and effective antibiotic management is therefore important to improve prognosis due to the high risk of mortality from infection

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Septic Babesia in an Asplenic Patient

Allison Cwikla, MSIII

Introduction

Babesia microti, a blood-borne parasitic protozoa, poses approximately 2,000 infections per year in the United States. Clinical disease ranges from asymptomatic, mild or moderate in immunocompetent patients to severe or fatal in immunocompromised or splenectomized patients. Mildly symptomatic patients are associated with a parasitemia < 4% and may exhibit irregularly cycling fevers, diaphoresis, body aches, headaches and nausea. Severely symptomatic patients, associated with a parasitemia >4%, may exhibit thrombocytopenia, hemolytic anemia, and malfunction of vital organs (i.e. acute respiratory failure, heart failure and renal failure).

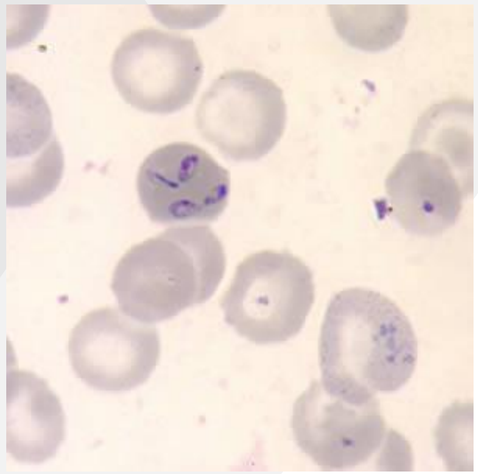

Image A – *Babesia microti* in thin blood smear Giemsa stained. Courtney of the Center for Disease Control.

Case Presentation

A 33-year-old male presented to the ED after one week of worsening dyspnea and intermittent fevers. Past medical history is significant for asthma and asplenia following an injury. Upon presentation, fever was 101ºF and O^2 saturation was 85%. Hgb and platelets were decreased at 10.1 and 83K. WBCs were elevated at 13K, D-dimer was elevated but follow-up CTA was negative for PE. Chest radiograph indicated a left lower lobe infiltration. He was started on ceftriaxone and vancomycin for community-acquired pneumonia in the setting of asplenia. A broad panel of pathogen labs were collected. Covid-19 test on admission was negative.

Seventy-two hours later, O^2 requirement increased from 4L by nasal cannula to 10L. Hgb decreased to 6.9. LDH was elevated at 1,261. WBC had increased to 32.4K. Two repeat COVID-19 PCR tests were positive. Intraerythrocytic ring shaped organisms were noted on peripheral blood smear, blood smears and PCR were positive for *Babesia microti*. Parasite load was 0.2%. Chest CT now indicated bilateral pulmonary infiltrates. The patient met criteria for hemolytic anemia, sepsis pneumonia, acute respiratory distress syndrome, and AKI. He was started on azithromycin, cefepime and atovaquone and received one unit of blood.

The following two days, his respiratory status and O^2 requirement gradually improved. Blood cultures and smear were negative. Patient vitals, symptoms and labs were stable at hospital day nine and he was discharged on atovaquone, azithromycin and oral prednisone.

Discussion

The potential severity of *Babesia microti* in asplenic patients has been described in medical literature. The preferred treatment regimen for such severe illness includes azithromycin, atovaquone and red blood cell exchange transfusion if necessary. This case confirms both the potential clinical severity of *Babesia microti* in and asplenic patient and supports the preferred treatment regimen by demonstrating rapid improvement in a severely ill patient. Additionally, this case emphasizes the importance of expanding infectious etiology in an asplenic patient and considering co-infections, especially during a global pandemic. This case highlights that a parasitemia as low as 0.2% with a superimposed viral infection can cause severe illness in an asplenic patient. However, with high clinical suspicion when presented an asplenic patient with hemolytic anemia, prompt diagnosis and treatment can be lifesaving.

UND SCHOOL OF MEDICINE & HEALTH SCIENCES
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Lysozyme-induced Nephropathy, a rare manifestation of nephrotoxicity in chronic myelomonocytic leukemia

Allison Cwikla, MSIII; Zain Qarni, MSIII

Introduction

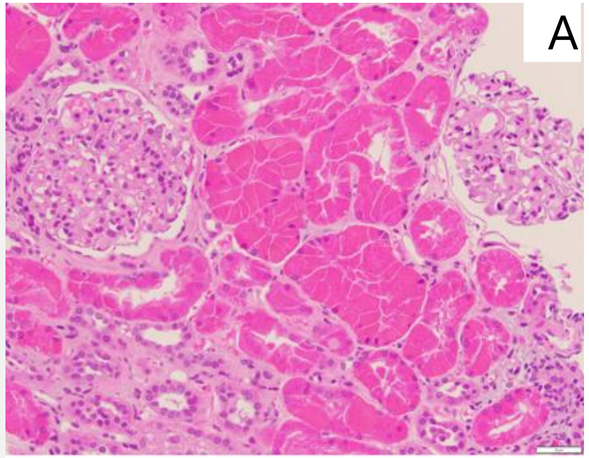
Lysozyme is a cationic protein produced by monocytes that functions as an antimicrobial in the host-pathogen dynamic. In rare cases of chronic myelomonocytic leukemia, lysozyme functions as a mechanism for nephrotoxicity. Excessive serum lysozyme results in glomerular filtration and reabsorption by the proximal tubule, typically resulting in acute kidney injury. In this case we will discuss an atypical presentation of this already rare disease.

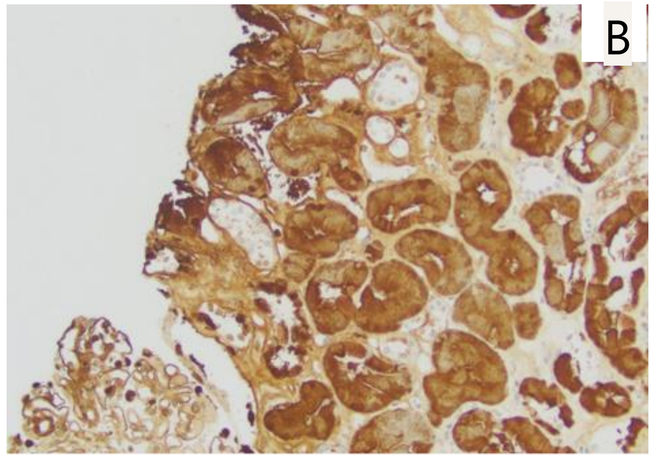
Case Presentation

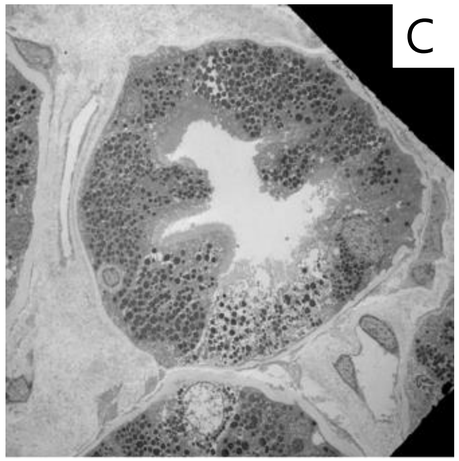
A 78-year-old male presented to nephrology in August of 2020 diagnosis of CKD Stage IIIB. In Dec 2018, the patient was diagnosed with chronic myelomonocytic leukemia (CMML) following an unspecified leukocytosis. At diagnosis, the patient was asymptomatic, WBC was elevated at 16,800 and serum creatinine was normal at 1.18. CMML management was recommended as watchful waiting due to absence of anemia.

From June 2019 - Sept 2020, WBC had steadily increased to 22,800, but he remained without development of anemia. Simultaneously, serum creatinine gradually increased from 1.40 to 1.53 and the patient was referred to nephrology. Routine work up was negative for alternative causes of increasing creatinine. Recent CKD diagnosis was attributed to the patient's chronic hypertension.

By August 2021, WBC had increased to 30.2K and serum creatinine had continued to increase to 1.77. A renal biopsy was performed and noted tubules distended by abundant protein granules in a pattern consistent with lysozyme nephropathy. A lysozyme immunohistochemistry stain showed extensive positivity in the affected tubular cells and a diagnosis of lysozyme-induced nephropathy was made.







Histology*

A - Light Microscopy: The tubules show prominent and diffuse expansion and distention of the cytoplasm by abundant protein-type granules however no crystals or atypical casts are present. There is mild interstitial fibrosis and tubular atrophy noted involving 15 to 20% of the cortex. No significant interstitial inflammation is seen. The arteries show moderate intimal fibrosis. No thrombosis or vasculitis is present.

B - Lysozyme immunohistochemistry staining is performed and shows extensive positivity in the affected tubular cells.

C - Electron Microscopy: Normal cellularity and normal mesangial regions are confirmed. There is only mild podocyte foot process effacement present. Examination of the tubulointerstitial compartment shows minimal fibrosis and no tubular basement membrane deposits are seen. The tubules show similar distension by prominent protein granules which ultrastructurally are consistent with lysozymes

*Courtesy of Dr Mary Fielder of Mayo Clinic Pathology and Dr. Nich Cossey at Arkana Laboratories

Discussion

To date, there are minimal case reports of lysozyme-induced nephropathy reported in medical literature. These cases are also associated with a previous diagnosis of CMML. In the prior cases, the diagnosis of LyN was achieved after presentation of an AKI, contrary to this case, in which LyN diagnosis was obtained following presentation of gradually increasing serum creatinine.

By demonstrating the presence of a simultaneous rise in neoplastic WBCs and a progressive increase in serum creatinine secondary to lysozyme deposits in tubules, this case supports the theorized pathophysiology of LyN and brings further awareness to a rare nephrotoxic phenomenon that may require consideration in a patient with CMML and decreasing kidney function.

In the future, clinicians with patients diagnosed with CMML should consider LyN as an etiology for patients noted to have gradual progressive rise in creatinine. These patients may require early nephrology involvement and nephroprotective protocols.

Cryptococcal Meningitis in an HIV-Negative, Non-Immunosuppressed Individual

Sanford Medical Center Fargo, UNDSMHS

Brett Cornforth MSIII, Dinesh Bande MD

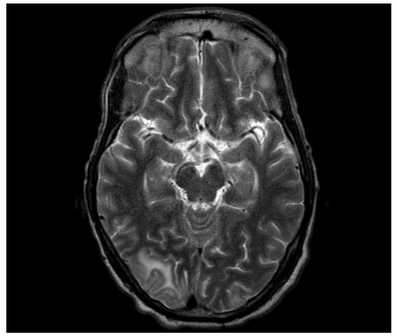
Background

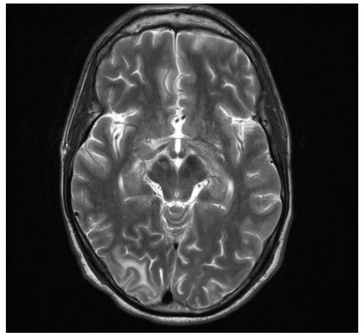
- Cryptococcal meningitis is a fungal meningitis that most commonly infects immunocompromised individuals, particularly AIDS patients
  - Approximately 85% of cases occur in Aids patients
- 30-70%10-week mortality in poor-resource countries and in immunocompetent individuals due to delayed diagnosis and/or lack of resources
- Symptoms at presentation include headache, altered mental status, nausea, vomiting, lethargy, fever, and nuchal rigidity
- *C. neoformans* is most common cause, but *C. gattii* has been found to have increased ability to infect otherwise healthy individuals

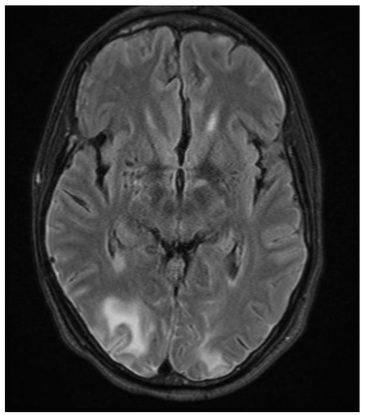
Presentation

- 39-year-old male presenting with increasing altered mental status
- PMH: polysubstance abuse, bipolar disorder, untreated Hepatitis C, and previously treated syphilis infection
- Initial presentation attributed to substance use and psych issues
- Lumbar puncture showed pleocytosis with pan-negative meningitis/encephalitis panel
- Initially treated for bacterial meningitis due to unknown etiology with vancomycin and ceftriaxone, with eventually advanced to vancomycin plus meropenem
- Initial brain MRI showed meningeal enhancement with occipital edema indicating coinciding cerebritis
- His encephalopathy cleared long enough for him to leave AMA, only to return later the same day with extreme worsening of headache
- Subsequent MRI showed progression of meningeal enhancement indicative of worsening meningitis
- Serum/CSF Cryptococcal antigen both came back positive

Imaging and Labs







- **Figure 1** (Upper Left) 1st MRI Brain with meningeal enhancement
- **Figure 2** (Upper Right) 2nd MRI 6 days later with increased meningeal enhancement suggesting worsening meningitis
- **Figure 3** (Lower Left) MRI Flair showing Right Occipital Cerebritis

- **Initial CSF Results**
- Glucose: 34 (low)
- Protein: 249.7 (high)
- RBC: 4 (high)
- WBC: 190 (high)
- Diff: Neutrophils = 15%
  Lymphocytes = 58%
  Eosinophils = 10% :

- **Special Studies**
- Meningitis/Encephalitis PCR Panel: Pan-Negative including cryptococcus
- Fungal Cultures: No Growth
- Cryptococcus Antigen Test
  - CSF: **Positive**
  - Serum: **Positive** :
- Anti-NMDA: **Positive**

Treatment

- Started on IV amphotericin B and flucytosine
- Progressive transaminitis led to transition from flucytosine to high-dose fluconazole
- ID directed dose management required due to progressively worsening hepatic and renal function
- Therapy consolidated to fluconazole 800 mg, to be continued for 8 weeks post-discharge, with 200 mg for 6-12 months
- LFTs, and creatinine normalized prior to discharge secondary to IV fluid management
- Plans for follow-up with ID for repeat lumbar puncture and MRI, GI referral for hepatitis C, and transition to residential IV drug rehab

Discussion Points

- Cryptococcal antigen testing is more sensitive than PCR testing and diagnosis should not be excluded due to negative meningitis panel (97% vs. 84% sensitivity)
- Anti-NMDA antibodies have been associated with CNS infections of HSV, syphilis, and cryptococcus. Treatment is to treat the underlying condition. Important to rule out malignancy, in this case CT chest/abdomen/pelvis was negative as were AFP, LDH, and hCG tumor markers
- Although cryptococcal meningitis is most common in immunosuppressed patients, it should not be ignored in immunocompetent patients as certain species can cause infections in healthy individuals, and delayed diagnosis leads to significant increase in mortality

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Scurvy Presenting with Geographic Tongue

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Introduction

- Scurvy is a systemic condition arising from vitamin C deficiency, characterized by impaired wound healing, arthralgias, gingivitis and cutaneous signs including petechiae, perifollicular hemorrhage, and bruising.[1]
- Scurvy has been observed to be increased in frequency recently mainly due to changes in dietary intake, increased alcohol consumption, and socioeconomic status.[1,2,3]
- Here we present a case with symptoms of geographic tongue which was initially considered to be autoimmune but further investigations and treatment confirmed the diagnosis of scurvy.

Case Presentation

- A 57-year-old female presented to ENT with a painful burning sensation in her tongue and lower lip.
- She had a 60-lbs weight loss over a 6-month period due to decreased oral intake secondary to tongue pain.
- A diagnosis of geographic tongue was made and treatment with a topical steroid was started.

2 months after initial presentation to ENT

- Minimal improvement of tongue symptoms with steroid
- Tongue biopsy done at this follow-up showed nonspecific glossitis
- Workup revealed positive ANA and normal B12
- Referral to rheumatology due to concern for autoimmune etiologies

Further history on rheumatology H&P

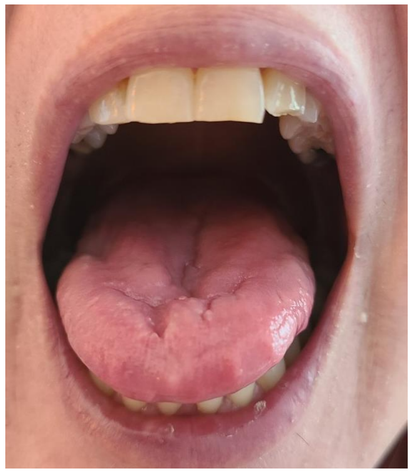
- Patient initially experienced numbness and pain in her bilateral feet, which progressed to her hands
- Months later, patient began experiencing tongue pain
- Recent gingival bleeding and easy bruising of the skin

Patient risk factors for scurvy

- Gastric bypass 15 years prior
- Daily consumption of 2 bottles of wine for the past 8 months
- Poor oral intake secondary to tongue pain

Physical exam

- General: Patient appeared fatigued.
- Skin: Petechiae over the dorsal aspect of bilateral forearms. Mild jaundice.
- HEENT: Red and rough tongue with geographic features.
- Musculoskeletal: No joint tenderness or swelling.



Laboratory data

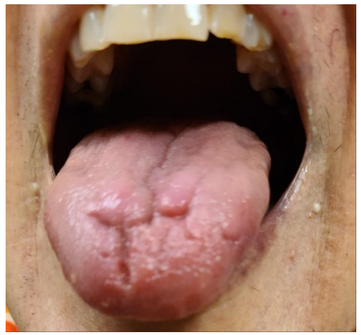
- Elevated AST suggestive of chronic alcohol abuse
- Hypocalcemia
- **Vitamin C level < 0.1 mg/dL**
- Serologic studies for vasculitides were negative

Treatment

- Calcium supplements 500 mg twice daily
- Vitamin C 500 units twice daily
- Advised patient to abstain from alcohol

1-month follow-up

- Improvement of tongue pain
- Patient reported that she was able to begin eating better
- Resolution of petechiae on forearms



Discussion

- This case highlights the relevance of nutritional deficiencies in Western countries and the importance of high clinical suspicion in patients with risk factors for poor nutrition.
- Although vitamin C deficiency is now rarely observed in high-income countries, low socioeconomic status with consequent food insecurity, fad diets, and substance abuse are contributing to increasing cases of nutritional deficiencies such as scurvy.
- Recognition of the signs and symptoms of scurvy in at-risk populations is crucial in preventing unnecessary suffering and even death from this disease.

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A rare case of asymptomatic solitary fibrous tumor of the pleura

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Introduction

A solitary fibrous tumor of the pleura (SFTP) is an uncommon mesenchymal neoplasm that accounts for less than 5% of all pleural tumors.[1] Most tumors are slow-growing and have a silent clinical course for several years and are usually discovered incidentally during chest X-ray examination. We present a rare case of a solitary fibrous tumor of the pleura (SFTP)

Case Summary

- 74-year-old woman with a history of atrial fibrillation and coronary artery disease was recently diagnosed with invasive ductal carcinoma of the right breast.
- The patient underwent a CAT scan of the chest as part of the staging for breast cancer. A lung nodule was found in the left lower lobe of the lung, and compared to the CAT scan done in 2014, the nodule increased from 1.2 cm to 2.4 cm. PET scan revealed the nodule to be FDG avid.
- Bronchoscopy was obtained to rule out possible infectious causes of the nodule, and workup was negative.

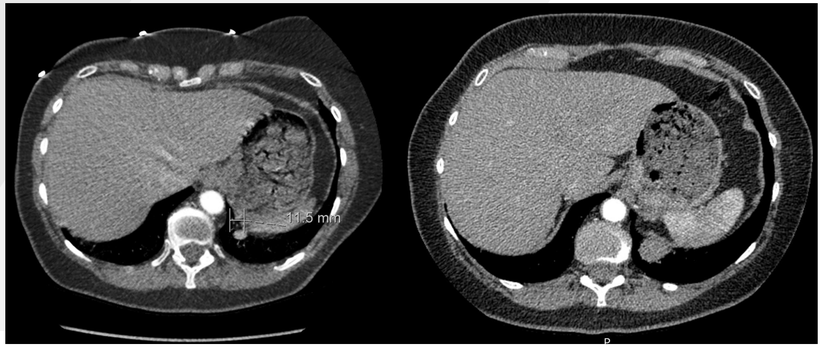

Figure 1: The lung nodule was discovered incidentally when patient underwent CT scan for another medical condition and was measured to be 1.2 cm. Seven years later, the same nodule was found to be 2.4 cm

- Wedge biopsy was done due to high concern for primary lung malignancy versus metastatic breast cancer, revealing a well-circumscribed, pleural-based nodule comprised of bland appearing spindle cells in the background of collagen fibrosis

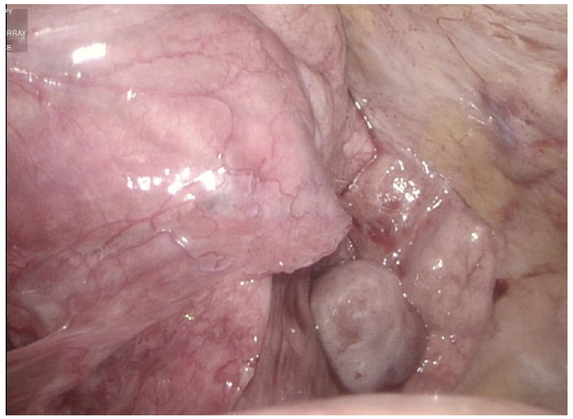

Figure 2: well circumscribed, pleural based nodule resected via wedge biopsy and was found to have bland appearing spindle cells in background of fibrosis

- Immunohistochemistry staining showed the neoplastic cells as CD34 and STAT6 positive while negative for pan keratin, S100, progesterone receptor, β-catenin, EMA, and desmin, confirming the diagnosis for solitary fibrous tumor with low metastatic risk.

Discussion

- SFTP is much more common in the fifth and sixth decades of life, with a similar distribution between sexes [2]
- There is no known association with tobacco, asbestos, or any other toxicant.
- More than 50% of the patients with SFTP are asymptomatic, and the tumor is usually an incidental finding on imaging.
- Symptoms are more often seen with larger/ central and malignant tumors, with several studies describing chronic cough, chest pain, and dyspnea as the most common symptoms.[3]
- Solitary fibrous tumors may be associated with paraneoplastic syndromes such as
  - Doege-Potter syndrome: hypoglycemia results from tumor production of insulin-like growth factor II and is reported to occur in 2-4% of patients with SFTP. [4]
  - Hypertrophic pulmonary osteoarthropathy also known as Bamberger-Marie syndrome has been described in as many as 20% of the SFTP cases.[5]
- Surgical excision is the treatment of choice for solitary fibrous tumors of the thorax
  - 5-year-survival rate of nearly 100%.[6]
- No follow-up guidelines exists for SFTP at present
  - If recurrence were to occur, most will take place within two years of resection
  - repeat imaging should be obtained every six months for the first two years and yearly after that [7]
- long-term follow-up that may extend to 15–20 years due to the possibility of late recurrence.[8]

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Effects of Cushing Syndrome on pregnancy and outcome of treatment: a case report

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Introduction

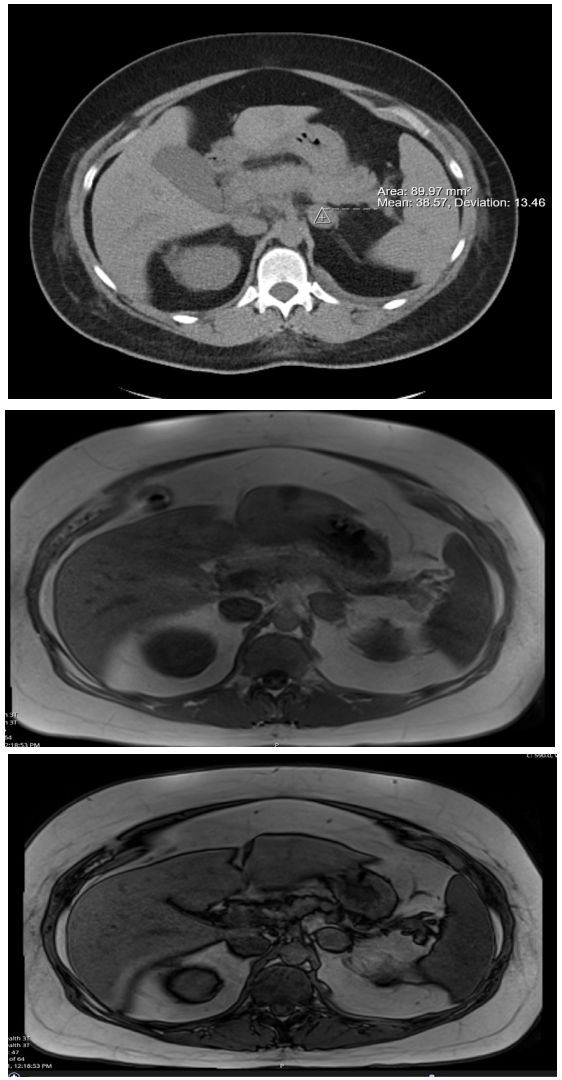
Cushing's syndrome (CS) in pregnancy is a rare complication, but it can have detrimental effects on the pregnancy. It can also easily be misdiagnosed for other problems associated with pregnancy, such as gestational diabetes mellitus, gestational hypertension, or preeclampsia. The physiologic changes of pregnancy make CS difficult to diagnose, so awareness of CS in pregnancy is imperative.

Case summary

26-year-old female at 17 weeks gestation with dichorionic-diamniotic twins was referred to an endocrinology clinic for elevated urinary cortisol level. She had also developed gestational diabetes mellitus and hypertension in this pregnancy. One year prior to referral, she was admitted to another hospital during pregnancy for preeclampsia and HELLP (Hemolysis, Elevated Liver Enzymes, , Low Platelets) syndrome, which resulted in loss of the pregnancy. An abdominal CT at this time showed a 2.4 cm mass on her left adrenal gland, but no further evaluation was performed.

Laboratory evaluation at the time of referral showed very high late night salivary cortisol (repeated three times), undetectable ACTH, elevated random cortisol, normal DHEA-sulfate, normal renin activity, and normal aldosterone-to-renin ratio, and normal plasma metanephrines. MRI abdomen without contrast showed an increase in size of adrenal mass. Upon further interviewing, the patient states that she had noticed phenotypic changes over the past couple years, including weight gain, abdominal striae, presence of a dorsal fat pad, acne, and moon facies.

Imaging



Case summary, cont.

Referral was made to surgery during second trimester, and a left adrenalectomy was performed. On discharge she was placed on oral hydrocortisone. After follow-up with her endocrinologist, she was continued on oral hydrocortisone and insulin was discontinued with frequent blood glucose monitoring. Most recent visit with maternal-fetal medicine specialist shows normal gestational size in one fetus with fetal growth restriction in the other. However, both fetuses have appropriate interval growth and biophysical profile scores of 8/8. She recently delivered at 33 weeks gestation with good outcome.

Conclusion

This case demonstrates the negative outcomes associated with CS in pregnancy and the importance of diagnosis and treatment to prevent complications associated with CS in pregnancy. In this patient's previous pregnancy, she had complications with gestational diabetes, preeclampisa and HELLP syndrome which resulted in pregnancy loss. With proper diagnosis, referral for the adrenalectomy during the second trimester and proper postoperative care, this patient has been able to safely carry this pregnancy with successful pregnancy outcome and without the recurrence of Preeclampsia.

Resources

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Effective Treatment of Hypertrophic Cardiomyopathy with Left Ventricular Outflow Tract Obstruction Utilizing a Covered Stent

Devon Pekas (MSBS, MSIII), Adya Chawda, and Nayan Desai (MD)

Introduction

- Hypertrophic cardiomyopathy (HCM) can result in an increased interventricular septum thickness leading to left ventricular outflow tract obstruction (LVOTO)
- Typical surgical treatment of HCM with LVOTO includes:
  - Myectomy= surgical removal of excess septal tissue
  - Alcohol septum ablation= induction of septal ischemia
- Here we present a patient with HCM with LVOTO who had an ASA planned, but due to intraoperative findings, a covered stent was placed instead. Placement resulted in the successful treatment of the symptomatic gradient.

Case Description

- 68-year-old non-Hispanic, Caucasian female
- Progressively worsening (6-18 months) exertional dyspnea, exertional chest pressure, exertional dizziness, and resting dizziness
- Past medical history: CVA, hypertension, and hyperlipidemia
- Medications: metoprolol 100 mg/day and aspirin 650 mg BID
- Physical:
  - BMI=35
  - 2/6 systolic murmur over aortic area, which worsened with Valsalva

Investigations and Interventions

- Echocardiogram:
  - Ejection fraction= 70-75%
  - HCM with dynamic subaortic stenosis
  - LVOTO= 156 mmHg with provocation
- Exercise stress test: Positive for dyspnea and dizziness
- Holter monitor: Negative
- Cardiac MRI: HCM with LVOTO **(Fig 3)**
- Investigatory coronary angiogram:
  - Mild-to-moderate nonobstructive CAD in RCA
  - Significant subaortic outflow tract gradient= >100 mmHg
- Planned alcohol septal ablation:
  - Communication of 2nd septal perforator with right ventricle
  - Flow-limiting dissection of mid-LAD
  - Due to the above findings, **ASA was not performed**
    - Instead, a covered stent was placed at the origins of the 3rd and 4th septal perforators with successful flow cessation **(Fig 2)**
    - LVOT gradient improved from 156 to 35 mmHg with provocation **(Fig 4)**

Images

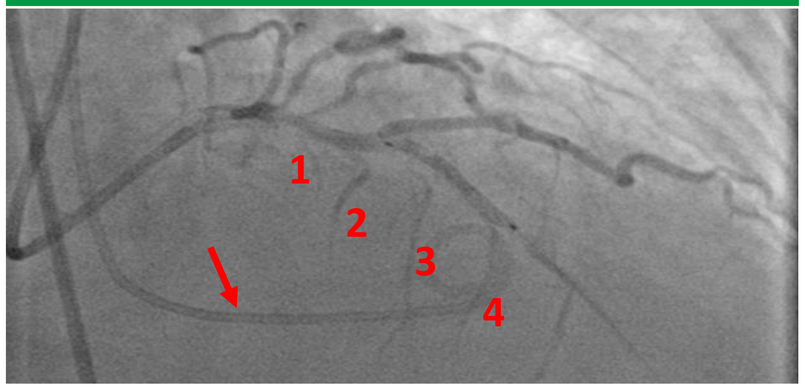


Figure 1: Dye injected pre stent placement showing four septal perforators. 1st-4th septal perforators numbered. Arrow=Pigtail in LV.

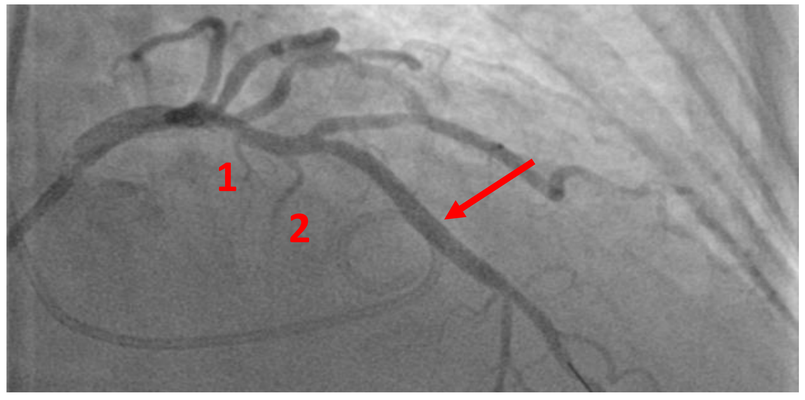


Figure 2: Dye injected post stent placement over the origins of the 3rd and 4th septal perforators showing lack of dye in the 3rd or 4th septal perforators. 1st and 2nd septal perforators numbered. Arrow=Stent.

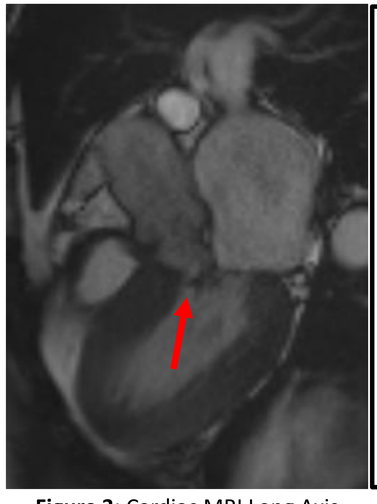


Figure 3: Cardiac MRI Long Axis showing LVOTO (Arrow=LVOT)

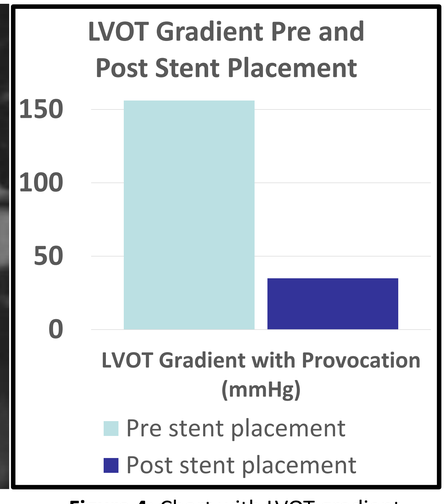


Figure 4: Chart with LVOT gradient pre and post operation

Follow-up

- Post operation: symptoms and gradient decreased
- 2 months post operation: symptoms remained stably decreased

Discussion

- Similar case reports, while rare, consistently showed short-term decreased gradients and improved symptoms
- Long-term results varied, with the cases of symptom recurrence resulting from collateralization of the septal tissue

Conclusions

- Covered stent utilization in the treatment of HCM with LVOTO can be considered in cases where ASA is either difficult or not feasible
- While this case shows short-term efficacy, due to previous case report results and no current long-term follow-up, long-term conclusions should not be drawn
- More scientific data must validate this approach before it is routinely considered concurrently with ASA or myectomy

Abbreviations

- ASA= Alcohol septal ablation
- CAD= Coronary artery disease
- CVA= Cerebrovascular accident
- HCM= Hypertrophic cardiomyopathy
- LAD= Left anterior descending
- LVOT= Left ventricular outflow tract
- LVOTO= Left ventricular outflow tract obstruction
- RCA= Right coronary artery

Appreciation

- Dr. Nayan Desai
- UNDSMHS
- ACP North Dakota Chapter

UND School of Medicine & Health Sciences
University of North Dakota

Sealing of Iatrogenic Ascending Aorta Dissection with Self-Expanding Transcatheter Aortic Valve Replacement Valve in a Patient with a Bicuspid Aortic Valve and Right-Sided Aortic Arch

Devon Pekas (MSBS, MSIII), Alex Hecker (MSIII), Adya Chawda, and Nayan Desai (MD)

Introduction

- Aortic dissection is a life-threatening complication of transcatheter aortic valve replacement (TAVR) occurring in 0.6-1.9% of cases
  - Urgent open surgical repair is the typical management of aortic dissection during TAVR
- Right-sided aortic arch (RSAA) affects 0.1% of the adult population
- Bicuspid aortic valve (BAV) affects 0.5-2% of the adult population
- There are less than 10 case reports containing both RSAA and BAV in a single patient
- Here we present a patient with RSAA and BAV who undergoes a TAVR for severe aortic stenosis. During the procedure, an iatrogenic ascending aorta dissection is sealed by deploying a TAVR self-expanding valve.

Case Description

- 65-year-old non-Hispanic, Caucasian female
- Progressively worsening aortic valve stenosis
- Past medical history: Obesity, aortic stenosis, hypercholesterolemia, hypertension, and COVID-19 (mild, nonhospital) 8 months prior
- Medications: verapamil 300 mg/day, hydrochlorothiazide 12.5 mg/day, olmesartan 20 mg/day, rosuvastatin 20 mg/day, and aspirin 81 mg/day

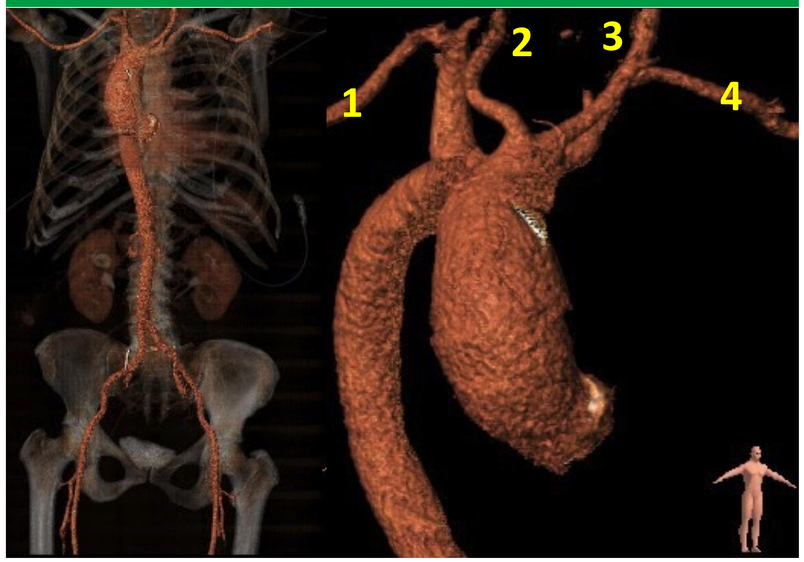
Physical:

- BMI=35
- 2/6 holosystolic murmur over mitral area
- 3/6 ejection murmur over entire precordium with radiation into neck

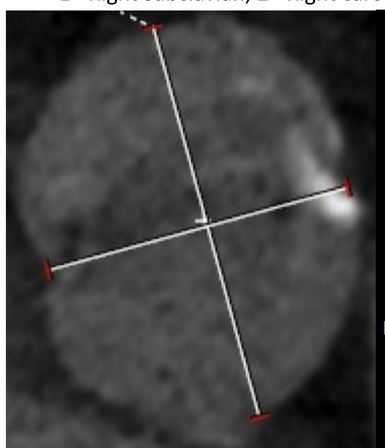
Investigations

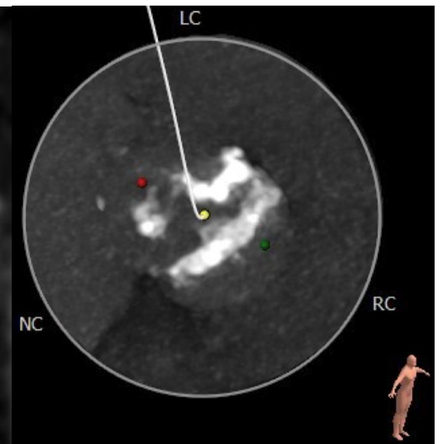
- Echocardiogram:
  - Bicuspid sievert type 0 aortic valve
  - Critical AV stenosis
    - Peak systolic aortic valve flow= 5.9 m/s (severe stenosis= >4 m/s)
    - Aortic valve mean gradient= 80 mmHg (severe stenosis= >40 mmHg)
    - Aortic valve peak gradient 139 mmHg
  - Ejection fraction= 50%
- Chest X-ray: RSAA
- Cardiac catherization:
  - Mild, nonobstructive CAD
  - Severe aortic calcification
  - BAV
  - RSAA
- Chest CTA: BAV and RSAA

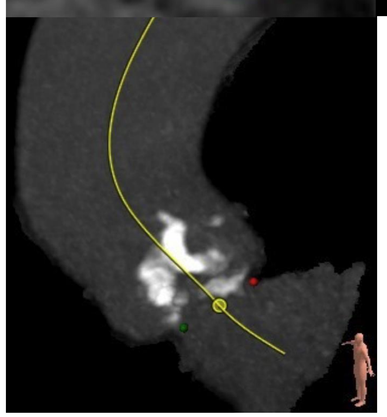
Images



Left and Right: Reconstruction of right-sided aortic arch with anomalous right subclavian and trifurcation of right carotid, left carotid, and left subclavian
1= Right subclavian; 2= Right carotid; 3= Left carotid; 4= Left subclavian







Top Left: Bicuspid sievert type 0 aortic valve

Top Right: Bicuspid aortic valve with calcifications highlighted, planar view

Bottom Left: Bicuspid aortic valve with calcifications highlighted, longitudinal view

TAVR Procedure

- Aortic root dissection identified
- Transesophageal echocardiogram showed:
  - Type A aortic dissection with a dissection flap in the ascending aorta and aortic arch without flow
  - No pericardial effusion and stable hemodynamics
- TAVR self-expanding valve was deployed, sealing the dissection
  - Contrast was trapped at the non-coronary cusp of the sinus of Valsalva
- Chose against open surgical repair and aortic root repair due to full seal
- CT confirmed full seal of focal, contained, short segment dissection over 2.1 cm posterior to the TAVR prosthesis at the level of the sinotubular junction

Follow-up

- Next-day echocardiogram:
  - Peak systolic aortic valve flow= 1.91 m/s
- 6-days post operative ED visit:
  - Heart palpitations of 2-day duration
  - Hypokalemia; EKG= Atrial fibrillation
  - Metoprolol (25 mg/day) started and hydrochlorothiazide discontinued
- 7-days post operative follow-up:
  - Chest CTA= no extension of dissection
  - $CHADS_2$= 3; Apixaban added (5 mg/day)

Conclusions

- Depending on location and severity, an iatrogenic ascending aorta dissection during TAVR can be sealed by full deployment of a Medtronic Evolut Pro 26 mm prosthetic AV
- Common surgical approaches (TAVR) can still be effective in treating severe aortic stenosis patients with anatomical variants such as concomitant BAV and RSAA

Appreciation

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