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The American College of Physicians Maine Chapter meeting was held virtually this year on September 25 and October 31st. A poster session included the submissions included here, from students and residents. These submissions represent scholarship in clinical, improvement science, and research activities. We are proud to share this work in the Journal of Maine Medical Center.

Emily Zarookian, MD

Ocular Neurosyphilis as First Manifestation of Infection in a non-immunosuppressed patient

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Introduction

Syphilis is a sexually transmitted infection caused by spirochete *Treponema pallidum*. In 2018, combined cases of syphilis, gonorrhea, and chlamydia hit an all-time high. 35,000 cases of primary and secondary syphilis were reported in the U.S. in 2018, representing a 14% increase from 2017. <https://www.cdc.gov/std/syphilis/default.htm>

Case

History of Present Illness:

59-year-old male presents to his primary care provider with 5 days of visual disturbances in the left eye. He describes episodes of cloudiness, appearance of blue strings of lights (photopsia), and tunnel vision only in the left eye. These episodes last only seconds and occur intermittently throughout the day. He denies headache, pain with extraocular movements, vision loss, dizziness, or history of similar episodes. Earlier in the year, his blood pressure was poorly controlled, but is currently well-controlled on lisinopril. His PCP placed an urgent ophthalmology referral due to concern for retinal detachment.

Funduscopy exam reveals a pale, swollen optic disc in the L eye with peripapillary venous congestion and a preserved physiologic cup (Figure 1A). Retinal imaging called Optical Coherence Tomography (OCT) shows retinal nerve fiber layer (NFL) edema OU, but worse in left eye. Due to concern for ischemic optic neuropathy due to Temporal Arteritis, his ophthalmologist orders a CRP/ESR. CRP 1.7 mg/dL and ESR 40 mm/hr, both mildly elevated. He immediately starts 80mg prednisone daily and is sent for temporal artery biopsy 3 days later. Tunnel vision improves, but he still sees ‘wavy blue lines’ and has an intermittent ‘blurred spot’ in his vision. Temporal artery biopsy is negative.

2-week follow-up with ophthalmology. Although symptoms improved, his visual field testing is worse in the left eye and OCT shows worsening NFL edema in both eyes (Figure 1B). Given worsening inflammation despite high-dose steroids, ophthalmologist recommends emergent brain MRI and Neurology consult.

PMH: HTN, HLD, migraines, anxiety, benign prostatic hypertrophy

SH: Never smoker. Does not drink alcohol or use recreational drugs. He is widowed and lives alone. Currently does not have health insurance.

FH: Father had HTN. Mother had COPD and T2DM. Sister has T2DM.

Medications: Lisinopril-HCTZ, Loratadine, Tamsulosin, Excedrin migraine, Tadalafil, Alprazolam PRN

Allergies: None

Physical Exam:

Vitals: Temp 37°C, BP 102/70, Heart rate 116 at first outpatient visit

GEN: Awake, alert, oriented, well appearing. In NAD.

HEENT: Sclerae anicteric. Conjunctivae noninjected. No discharge.

Neck: No lymphadenopathy, masses, or thyromegaly. No JVD. No neck stiffness.

CV: +S1/S2. Tachycardic. Regular rhythm. No murmurs, rubs, or gallops.

Neurologic: Visual acuity grossly intact. PERRLA, EOMI, no afferent pupillary defect. Strength, sensation, reflexes intact. Normal gait. CN II-XII intact.

Ophthalmologic Imaging

Figure 1. Optical coherence tomography (OCT) using Spectralis Tracking Laser Tomography. The top images represent the retina and the bottom images represent a cross section of the retina with the optic nerve in the middle. A) 11/26/2019 first visit to ophthalmologist. B) 12/10/2019 follow-up after 8 days of high-dose prednisone. C) 1/28/2020 follow-up 3 weeks after completing IV Penicillin treatment.

Hospital Course and Treatment

- 15 days after initial visit, presents to ER for workup & Neurology consult
- MRI brain w/o gadolinium:** No significant abnormality
- MRI/MRA/MRV head w/ gadolinium:** No significant abnormality.
- Lumbar puncture:** Traumatic tap. Difficult to interpret initially; the traumatic tap may account for elevated WBC and protein.
- 7 days later, develops **ringing in both ears** and new headache.
- RPR, Treponemal EIA, and CSF VDRL are positive, suggesting neurosyphilis
- 4 weeks after initial visit, he is admitted for 2 days of IV Penicillin G 5 million units Q4 hours, then discharged with midline to receive 20 million units by continuous infusion for total 14-day course.
- 3-week follow-up: Auditory disturbance resolved promptly. Vision gradually improving since treatment. Retinal imaging shows marked improvement (Fig 1). He will continue follow-up with serial RPRs.

Laboratory Findings

87% PMNs	16.4	133	101	44	137
25.8	414	4.8	23	1.06	
49					

LFTs normal
CRP: 1.7 (< 1)
ESR: 40 (0-20)

CSF Studies (traumatic tap):

- Glucose: 66 mg/dL (nl 50-80)
- Protein: 82 mg/dL (15-45)
- RBC: 11,000/mm³ tube 4 (14,000 tube1)
- WBC: 24/mm³, 53% PMNs, 47% Monos (corrected for RBCs: 23.95)
- Gram stain: 1+ PMNs, no growth
- EBV PCR (-); HSV DNA: Not detected
- ACE CSF <0.4 (normal)
- 0 CSF Oligoclonal bands seen
- CSF VDRL titer 1:2 (Low positive)**

Other Blood tests:

- Lyme Ab Scrn (+); Confirmatory Western blot (-)
- Quantiferon Gold (-), HIV1/2 (-), ACE: <5 (normal)
- Neuromyelitis Optica/AQP4 FACS negative
- RPR Screen: Reactive**
- RPR Titer: 1:128**
- Syphilis IgG (Treponemal EIA): Positive**

Testing Algorithms for Syphilis

Testing for Syphilis Infection

- Darkfield microscopy and PCR are definitive tests, but infrequently used as they are difficult to perform
- Presumptive diagnosis requires: **Nontreponemal test** (Venereal Disease Research Laboratory (VDRL) or Rapid Plasma Reagin (RPR)) + **Treponemal Test** (i.e. Fluorescent treponemal antibody absorbed (FTA-ABS), *T. pallidum* passive particle agglutination (TP-PA) assay, enzyme immunoassays (EIAs))
 - Nontreponemal tests have high false-positive rates and are associated with many other medical conditions
- Traditional Screening Algorithm: Screen with Nontreponemal test -> if positive, confirm with Treponemal test
- Reverse Screening Algorithm: Screen with Treponemal test to determine if patient has ever been exposed to *T. pallidum* -> if positive, follow with Nontreponemal test to determine if patient has active infection

Further testing for Neurosyphilis

- CSF VDRL preferred test, highly specific but not sensitive
 - False-positives can be due to contamination with peripheral blood
 - False-negative may occur in >25% of patients
- CSF WBC often elevated with lymphocytic predominance
- Fluorescent treponemal antibody absorption (FTA-ABS) is sensitive, but less specific test
- Serum RPR titer $\geq 1:32$ is associated with increased likelihood of neurosyphilis in patients with syphilis infection

Discussion

Clinical Presentation

- Syphilis can present in 3 stages, often with periods of latency (no symptoms, but positive serologies) in between:
 - Primary: painless chancre at site of transmission
 - Secondary: development of systemic symptoms including fever, lymphadenopathy, skin rash, mucocutaneous lesions
 - Tertiary: gummatous disease, tabes dorsalis, cardiovascular disease
- Neurosyphilis and Ocular Neurosyphilis can present during any stage
 - Syphilis can affect any part of the eye itself and can cause range of symptoms, including eye pain, vision loss, photopsia, Argyll Robertson pupil, eye pressure, photophobia. Uveitis is most common ocular manifestation.
 - Ischemic optic neuropathy can occur as part of ocular neurosyphilis
- Persons with CNS involvement can present with symptoms of meningitis, encephalitis, dementia, stroke, altered mental status, cranial nerve findings, auditory or ocular defects, tabes dorsalis, and paresis.
- HIV infection is a major risk factor for syphilis infection.
 - Rate of HIV co-infection with syphilis ranges between 20-70%.**
 - Patients with HIV and syphilis co-infection are at higher risk of developing neurosyphilis.

Therapy

- Parenteral Penicillin G is preferred for all patients with syphilis
- Refer to CDC Guidelines for which Penicillin G formulation (i.e., benzathine, aqueous procaine, aqueous crystalline) is appropriate for each stage of syphilis infection

Neurosyphilis:

- Aqueous crystalline Penicillin G 18-24 million units per day (3-4 million units IV every 4 hours or continuous infusion for 10-14 days)
- OR Procaine penicillin G 2.4 million units IM once daily + Probenecid 500mg PO 4 times daily for 10-14 days
- Adjunctive steroid treatment is thought to improve optic nerve function and prevent Jarisch-Herxheimer reaction but needs more data to support its routine use.

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Atrial Mass: Case Presentation of Primary Cardiac Neoplasm

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Introduction

- The occurrence of a primary cardiac malignancy is exceptionally rare.
- Of these, angiosarcoma is the most commonly seen histological subtype, known well for its' invasive behavior.¹
- Overall, a diagnosis of cardiac angiosarcoma carries with it a poor prognosis.
- However, there have been tremendous advances made in the ability to view and distinguish tumors.

Image 1:
Apical 4 chamber view TTE with no apparent atrial or ventricular masses noted.

Image 2:
Mid esophageal 2 chamber view TEE clearly delineates a large left atrial mass.

Case Description

- 89-year-old male with atrial fibrillation on apixaban, aortic stenosis with recent transcatheter aortic valve replacement (TAVR) (01/2020), prior embolic stroke (04/2020), hypothyroidism, BPH presenting June 2020 found to have a *Streptococcus bovis* bacteremia.
- In the setting of bacteremia, evaluation for endocarditis was pursued with echocardiography.
- An initial Transthoracic echocardiogram (TTE) was unremarkable, with subsequent Transesophageal echocardiogram (TEE) demonstrating a large left atrial mass.
- A cardiac MRI confirmed a large lobulated mass in the left atrium which extended into the left lower lobe pulmonary vein.
- Cardiology consult did not recommend a cardiac biopsy due to it being a high risk procedure.
- Staging CT of the chest, abdomen, and pelvis was obtained with metastatic disease in lower pole of the left kidney well as multiple nodules in the left lower lobe.
- CT-guided biopsy of the left renal mass confirmed malignant spindle cell neoplasm, consistent with high-grade sarcoma.

Image 3 (left):
Contrast image performed via TEE shows vascularity within intra-atrial mass.

Image 4 (right):
Cardiac MR (axial view) shows large lobulated mass (6.7 x 5 x 4.8 cm) lesion centered within left atrium, extending into left lower lobe pulmonary vein with probable occlusion. Demonstrates heterogeneous enhancement after administration of gadolinium.

Discussion

- Angiosarcomas are known for their rapidly progressive nature.²
- Recent TAVR in January 2020, at which time no atrial mass was present indicating tumor advancement in sheer months.
- TEE has been known for superior image resolution with better visualization of posterior cardiac structures.³
- Cardiac MRI aids in distinguishing between thrombi and tumors within cardiac chambers.⁴
- This case further necessitates the utility of a multimodal approach to non-invasively characterize a cardiac mass, which has been instrumental in achieving an earlier diagnosis of cardiac angiosarcoma.
- Due to advanced stage at diagnosis and aggressive course of disease,¹ complete surgical resection has been challenging.
- Furthermore, the exact benefit of adjunctive chemotherapy and/or radiation is still unknown.
- Nonetheless, until further research into angiosarcoma mutations and potential target drugs are identified, prognosis remains poor.

Image 5 (top):
Low power view demonstrating densely cellular neoplasm.

Image 6 (bottom):
High power view showing polygonal and spindle tumor cells with slit-like channels and extravasated red cells.

Discussion (continued)

Image 7:
CD31 immunohistochemistry with cytoplasmic and membrane staining of tumor cells.

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Disclosures

No Disclosures

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Multisystem Inflammatory Syndrome Associated with SARS-CoV-2 Infection, More Than a Pediatric Syndrome

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Case Description

Patient: 27-year-old previously healthy African female

Symptoms:

Five days of rigors, diarrhea, diffuse maculopapular rash, and oliguria.

Physical exam:

Fatigued, ill-appearing, tachycardic, abdomen diffusely tender, maculopapular rash on the medial sections of the extremities.

Vitals:

BP 84/52 | HR 111 | Temp 36.7 °C (98 °F) (Oral) | RR 27 | SpO2 97%

Labs:

Absolute lymphocytes 420 cells/uL, creatinine 5.6 mg/dL, troponin I 0.43 ng/mL

Inflammatory markers: ESR 33 mm/hr, CRP 344 mg/L, D-dimer 2818 ng/mL, ferritin 1082 ng/mL

Data

COVID testing:

- Three consecutive COVID nasal swab PCR tests were collected over a three-day period and returned negative.
- Subsequent antibody testing did return grossly positive for COVID IgG 11 days after the start of her symptoms.

Imaging:

- Echocardiogram showed mild to moderate global hypokinesis, left ventricular ejection fraction 40-45%, mildly dilated right ventricle, mild tricuspid regurgitation, and pericardial effusion.
- CT chest showed bilateral patchy ground-glass opacities and small bilateral pleural effusions.
- CT abdomen/pelvis with small ascites

Treatment Course

- Patient was transferred to the COVID ICU in the setting of mixed hypovolemic, vasoplegic, and cardiogenic shock.
- She was given vasopressors, heparin for anticoagulation, and later stress dose corticosteroids.
- A course of empiric broad-spectrum antibiotics was completed despite culture data not elucidating a bacterial source.
- Testing for viral and bacterial infections, as well as rheumatologic and malignant causes was negative.
- The patient slowly improved with supportive care. Suspicion returned to COVID as other causes were eliminated.
- Remdesivir, tocilizumab, and convalescent plasma were not given as COVID testing had been negative while she was inpatient.
- Disposition: 7 days in the ICU and 13 days total in the hospital before discharging home.

Key Points

- This case highlights that MIS can occur in adults.
- Further studies are needed to determine the following for MIS:
 - Pathophysiology
 - Prevalence (PCR positive or negative)
 - Accuracy of diagnostic criteria
 - Treatment (steroids, IL-6 inhibitors, etc.)
- We hope that this case will raise clinician awareness of MIS-A and, by doing so, impact outcomes.

Multisystem Inflammatory Syndrome in U.S. Children and Adolescents (MIS-C)

NEJM article, 186 cases of MIS-C from 26 states in three months.

MIS-C Diagnostic Criteria:

- Hospitalization
- < 21 years old
- Fever for > 24 hours
- Lab evidence of inflammation
- Evidence of SARS-CoV-2 Infection
- Multisystem organ involvement:
 - GI (92%)
 - Cardiovascular (80%)
 - Hematologic (76%)
 - Mucocutaneous (74%)
 - Respiratory (70%)

14/186 patients developed MIS-C an average of 25 days after COVID symptom onset.

Treatment (No efficacy data):

- IVIg, steroids, IL-6 inhibitors (tocilizumab), anticoagulation

Case Series of Multisystem Inflammatory Syndrome in Adults with SARS-CoV-2 Infection – UK and US, March-August 2020

CDC Case Series of 27 patients suspected to have MIS-A

MIS-A Diagnostic Criteria:

- Hospitalization
- > 20 years old
- Lab evidence of inflammation
- Evidence of SARS-CoV-2 Infection within 12 weeks
- Absence of severe respiratory illness
- One or more severe extrapulmonary organ involvement:
 - GI
 - Cardiovascular
 - Hematologic
 - Mucocutaneous

Patients developed MIS-A an average of 2-5 weeks after COVID symptom onset. 8/27 had no preceding COVID symptoms.

Treatment (No efficacy data):

- IVIg, steroids, IL-6 inhibitors (tocilizumab), anticoagulation

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Dreading the Worst: Osmotic demyelination syndrome secondary to rapid correction of hyponatremia

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Introduction

This case reflects the gravity with which perturbations in extracellular [Na⁺] and their subsequent correction must be approached especially in patients who are at high risk for developing Osmotic demyelination syndrome (ODS).

Case Presentation

- 52 years old gentleman with Hx of HTN, alcohol use presents to ED with worsening dysphagia and altered mental status.
- Recent hospitalization(8 days ago) for hyponatremia in setting of alcohol use and being on diuretics. He presented at that time with slurred speech and altered mental status. CT and MRI head were unremarkable. SNa was 116 mEq/L on admission. K was 2.2. LFT's were moderately deranged. Serum osmolality was 230.Urine Na was 11 and osmolality was 500 mOsm/L.TSH and cortisol were normal. He was treated with 1L of LR and NS which subsequently dropped his SNa to 101 mEq/L. He was then treated with continuous 3% hypertonic saline infusion. Over the next 24 hours his serum sodium was corrected to 117 mEq/L. Serum Na then gradually increased to of 131 mEq/L by the time of discharge two days later. He continued to have intermittent confusion during hospitalization but remained without focal neurological deficits. He was eventually discharged to home after a repeat MR of the brain was unremarkable
- Home Medications:
 - Hydrochlorothiazide -lisinopril 12.5mg-20mg, 2tab daily, Metoprolol succ 200mg daily

Physical exam and Labs

Physical Exam:

Vitals: BP 112/78 | Pulse 84 | Temp 37.6 °C (99.7 °F) (Axillary) | Resp 17 | Ht 1.829 m (6') | Wt 103.8 kg (228 lb 13.4 oz) | SpO2 97% | BMI 31.04 kg/m²

Neuro exam:

Does not follow commands. Does not attempt to speak :Cranial nerves: II-XII Intact. Motor: Brisk withdrawal of both legs with plantar stimulation. Mild withdrawal of both arms with noxious stimulation: Reflexes: 5+ beats of clonus at the right ankle, sustained clonus at the left ankle, Sensory: Grimaces to noxious stimulation in all extremities. Coordination: No observed intentional movements from which to judge coordination. Gait: Unable to walk secondary to altered mental status.

Labs: CBC: Normal: BMP: Normal. AST:45 U/L, ALT: 76 U/L, Bili: Normal, Ammonia: 29

MRI Brain: Hyperintensity in the pons, putamen ,caudate and thalamus bilaterally concerning for ODS.

Hospital Course

He was admitted to the hospital and due to his neurologic and MR findings concerning for ODS, was treated with 5 sessions of plasmapheresis. His neurological deficits eventually progressed to “locked in” syndrome and repeat MRI showed worsening of the demyelinating lesions. His family made the decision to pursue comfort directed care and he ultimately passed away.

Normal MRI Brain

Pons hyperintensity signal

Basal Ganglia hyperintensity signal

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Discussion

- Osmotic Demyelination syndrome (ODS) refers to central pontine myelinolysis and extra pontine myelinolysis. The typical clinical course is biphasic. Initially the patient may present with encephalopathic features or seizures due to hyponatremia. As normal sodium concentrations are restored, clinical improvement initially occurs. In the next few days, the patient's condition deteriorates, with flaccid paralysis of all 4 limbs and inability to chew, swallow, or speak. Some patients are left in a state of mutism and paralysis with relatively intact sensation and comprehension (termed pseudo coma or locked-in syndrome.
- High risk patients for ODS are: Severe hyponatremia (SNa <120),chronic alcohol use, malnutrition, prolonged diuretic use, hypokalemia, and liver disease
- Recent American guidelines target replacement rates of 4–6 or 4–8 mmol/L/day in patients at high or low risk for ODS, respectively.
- Treatment of severe hyponatremia with hypertonic saline is necessary and indicated for patients who present with severe neurologic symptoms however the rate of correction should not exceed 6-8 mEq/L and continuous infusion of hypertonic saline should be avoided.
- Reversing rapid correction of hyponatremia with desmopressin and/or hypotonic fluids in osmotic demyelination animal models has been shown to reduce mortality, but data in humans are limited
- Once ODS develops, treatment options are IVIG, High dose steroids and plasmapheresis. The outcome is variable with these treatment modalities.

Conclusions

- It is important to identify patients at high risk for osmotic demyelination syndrome and to correct their hyponatremia appropriately.

Peri-Operative Diagnosis of Isolated CNS Echinococcus Presenting as Seizure and Headache

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Introduction

- Echinococcus is a zoonotic parasitic disease with a unique life cycle (Figure 1) that can infect humans via fecal-oral transmission.
- Eggs passed into feces become ingested by an intermediate host (livestock or sometimes, humans) and penetrate into the small intestine, thus migrating to other systems via blood with development into cysts.
- The greatest prevalence is found in the countries of temperate climate zones.
- In humans, infection primarily presents as cysts that are most commonly found in the liver (~65%), rarely are those infections observed in other organ systems.
- If left untreated, infected patients are at risk of developing organ dysfunction, as well as anaphylaxis from cyst rupture.
- Isolated intracerebral cystic echinococcosis lesions are extremely rare and represent only 1-2% of all cases.

Figure 1. The life cycle of Echinococcus.

A case of isolate intracerebral echinococcosis in an adult female in Portland, Maine.

- A 41-year old immuno-competent female from Rwanda with one-year history of recurrent headache is evaluated in the emergency department for new-onset grand-mal seizures.
- She denied any contact with animals or recent travel, except for a 10-month trip to Rwanda two years prior where she recalls that she consumed meat that was prepared by other people.
- Laboratory findings were unremarkable.
- Physical exam did not reveal any focal neurological deficits.

Imaging

Hospital Course

- Despite a lack of clear preoperative diagnosis, it was decided to proceed with surgery given the patient's recurrent seizures and the lesion's accessible location.
- Intraoperatively, the neurosurgeon was suspicious of a parasitic infection given the resemblance of the observed mass to a hydatid cyst.
- The cyst was successfully resected however, with accidental rupture.
- The specimen was sent to pathology, with confirmatory identification of dead larvae, prompting the concern for parasitic infection without clear specific etiology.
- Infectious Disease was consulted for concern for management.

Diagnosis & Management

- The solitary, non-calcified, and anechoic nature of the cystic mass on imaging, as well as the report of gross inspection in the OR was highly suspicious for Echinococcus infection versus the more common Neurocysticercosis.
- Empiric treatment was initiated with oral albendazole 15mg/kg/day for a minimum of 3 months to cover both organisms.
- Serologic studies were sent and returned positive for Echinococcal IgG antibodies a week later, confirming the diagnosis of Echinococcus.
- At two-week follow-up, she denied recurrent seizures and successfully resumed all activities of daily living.
- Follow-up imaging with MRI at 1- and 2-months revealed resolving postsurgical changes at the site of resection without evidence of recurrence.

Discussion

- Although rare in the United States, this case illustrates the importance of considering Echinococcus in the differential diagnosis of a cystic brain mass, especially in areas with large immigrant populations whom have traveled from countries with increased prevalence of parasitic disease.
- This case illustrates the rare possibility of non-hepatic cystic lesions as the causal representative finding of Echinococcus infection.
- Early recognition via history and radiologic findings may help guide management with early induction of anti-helminthic therapy, as well as increased preparedness to avoid cyst rupture during surgery.

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How well does the Surprise Question Predict 1-year Mortality for Patients with COPD?

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Introduction

- COPD is the 4th leading cause of death globally.
- Current prognostic tools are hard to use in the inpatient setting for COPD.
- The surprise question (SQ) is quick to implement and has been used in some other diseases as an effective prognostic tool.
- **Objective:** To understand how well the SQ predicts 1-year mortality and prompts advance care planning (ACP) in acute exacerbation of COPD.

Methods

- Retrospective observational analysis of patients admitted to MMC for acute exacerbation of COPD (2015-2018).
- Inpatient providers were asked the SQ, “Would you be surprised if this patient died in the next year?”
- SQ+ response equates, “No, I would not be surprised”, SQ- “Yes, I would be surprised.”
- We assessed performance of the SQ in predicting mortality and prompting ACP using test characteristics and logistic regression.

Results

- 30% of responses were SQ+.
- SQ+ patients were older and more likely to have been admitted multiple times in the six months prior than SQ- patients.
- SQ+ and SQ- patients were otherwise similar in terms of comorbidity burden and baseline characteristics.
- There were no differences in ICU admission, intubation, length of stay, code status on admission, or number of readmissions in six months by SQ response.
- More patients with SQ+ were discharged to a rehabilitation facility than SQ- patients.
- 1-year mortality was 22% overall, and for SQ+ patients was 39%.

<https://knowledgeconnection.mainehealth.org/jmmc/2021/iss1/14>
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The surprise question is associated with one-year mortality and should prompt advance care planning in patients with COPD.

Table 1. Test characteristics (95% CI) of the SQ for predicting 1-year mortality

Sensitivity	0.47 (0.36, 0.58)
Specificity	0.75 (0.70, 0.80)
Positive predictive value	0.35 (0.26, 0.45)
Negative predictive value	0.83 (0.78, 0.88)

Table 2. Receipt of advance care planning by SQ response

	SQ+	SQ-
Goals of care conversation	27 (25 %)	27 (11 %)
Advance Directive or POLST completed	39 (36 %)	64 (25 %)
Code status change from full code	33 (30%)	38 (15%)
Palliative care consult	33 (31 %)	36 (14 %)

All comparison $p < 0.01$

Unadjusted and adjusted^a associations of the SQ with 1-year mortality and advance care planning^b

^a Adjusted for age, sex, and number of admissions in prior six months

^b ACP was considered to have occurred if any of the following were true: AD or POLST form in chart, GOCC completed, PC consultation performed, or any change in code status documented

Abbreviations: COPD, chronic obstructive pulmonary disease; SQ, surprise question; MMC, Maine Medical Center; ACP, advance care planning; CI, confidence interval; POLST, physician order for life sustaining treatment

School of
Medicine

Does Chronic Immunosuppressive Therapy Lower the Risk of Developing Severe Disease when Infected with COVID-19?

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Background and Purpose

- Individuals susceptible to COVID-19 represent heterogeneous populations.
- Risk stratification is critical to target screening, therapeutic interventions, and resource allocation.
- It is unclear whether rheumatic disease patients on immunosuppressants are at higher risk of developing severe COVID-19 disease.
- Current recommendations are to stop therapy if infected with COVID-19, except hydroxychloroquine (HCQ) and tocilizumab in select circumstances.
- Limited and conflicting data warrant surveillance of patients on chronic immunosuppressive therapy.
- We aim to assess correlation between various rheumatic diseases, their therapies, and severity of COVID-19 illness.
- Hypothesis: Pre-COVID19 immunosuppression with a direct anticytokine therapy will correlate with milder COVID-19 disease severity.

Methods

Descriptive analysis of 3 adult rheumatology patients on chronic immunosuppressive therapy in a single rheumatology practice who were diagnosed with COVID-19 by nasopharyngeal swab between March and May of 2020. We retrospectively collected data presented in Table 1.

Table 1. Demographics, clinical characteristics, treatment, and outcomes

Demographics	Patient 1	Patient	Patient 3
Age	75	78	88
Sex	M	M	F
Race	Caucasian	Caucasian	Caucasian
BMI (kg/m2)	26	26.08	19.4
Hx of tobacco use	Yes	No	Yes
Co-Morbidities			
Hypertension	Yes	No	Yes
Hyperlipidemia	Yes	Yes	No
CAD	No	No	Yes
Chronic Kidney Disease	No	No	No
Diabetes	No	No	No
Chronic pulmonary ds.	No	No	No
Home Medications			
Anti-coagulation	No	No	Yes
Anti-platelet therapy	No	No	No
ACE-I/ARB	Yes	No	No
Rheumatologic Data			
Baseline Disease	PsA	PMR, Seronegative Inflammatory Arthritis	PMR, Sarcoidosis
Disease Activity	Remission	Active	Remission
Immunosuppressive therapy +dose	ADA: 40mg q2wks MTX: 20mg/wk	MTX: 20mg/wk Pred: 2mg/d	HCQ: 300mg/d
Length of therapy	ADA: 13yrs MTX: 27yrs	MTX: Unknown Pred: 10yrs	HCQ: 7 months
Was therapy held for COVID-19?	Yes	MTX: Yes Pred: No	No

Treatment and Outcomes	Patient 1	Patient 2	Patient 3
Treatment	HCQ, Ceftriaxone, Azithromycin, Cefepime, Furosemide	Acetaminophen	None
ARDS diagnosis	Yes	No	No
COVID-19 ds. severity based on CURB65 score	Severe (CURB-65:4)	Mild	Mild
ICU stay	Yes	No	No
Mechanical Ventilation	Yes	No	No
ECMO	No	No	No
Length of ventilation (d)	3	N/A	N/A
Length of ICU stay (d)	6	N/A	N/A
Length of hospital stay (d)	19	0	1
Length of symptomatic ds. (d)	24	21	8
Full Recovery	Yes	Yes	Yes
Abbreviations	ADA: adalimumab; CXR: chest xray; HCQ: hydroxychloroquine; MTX: methotrexate; N/A: not applicable; ND: not done; PMR: polymyalgia rheumatica; Pred: prednisone; PsA: psoriatic arthritis; UNK: unknown		

Conclusion

- Patient 1 with long term monoclonal antibody and DMARD use, developed the most severe COVID-19 disease
- Patient 1 was also the only subject on an ACE-I.
- Patients 2 and 3 who were on a DMARD developed mild COVID-19 symptoms despite presence of sarcoidosis in patient 2.

Discussion

Given limited data, a meaningful statement cannot be made regarding blunting of COVID-19 disease severity with immunosuppressive therapy. We plan to conduct a year long retrospective chart review of new COVID-19 patients with rheumatologic conditions in the state of Maine. In addition to the data in table 1, we will ask our rheumatologists to assess the development of post-COVID neutralizing antibodies with the knowledge that some DMARDs can interfere with post-vaccination development of protective antibodies. We will then use a multi-variate analysis to extrapolate which immunosuppressive therapies were associated with the best outcomes. We aim to develop a secure data-base where Maine rheumatologists can upload de-identified data and facilitate data collection.

Results

- Demographics: 75-88 yrs, Caucasian, similar co-morbidity profile including hx of HTN, HLD, and absence of baseline obesity, pulmonary disease or diabetes.
- Patient 1, a 75 y.o. male with PsA on Adalimumab and Methotrexate developed severe COVID-19 as defined by a CURB-65 score of 4. He was intubated, treated with HCQ, antibiotics, diuresis, and achieved full recovery after 19 days of hospitalization.
- Patient 2, a 78 y.o. male with polymyalgia rheumatica and seronegative inflammatory arthritis on Prednisone and Methotrexate presented with mild symptoms without known pulmonary manifestations. He was not hospitalized and achieved full recovery after 21 days.
- Patient 3, an 88 y.o. female with polymyalgia rheumatica and sarcoidosis on HCQ developed mild symptoms of COVID-19 without pulmonary manifestations. She was hospitalized for one day and achieved full recovery after 8 days.

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Communication with “remote” caregivers during the COVID-19 pandemic: Early results of a mixed method study

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Introduction

- Hospital visitor restrictions have been prevalent during the COVID-19 pandemic.
- These restrictions prevent informal caregivers, including family or friends, from helping their loved ones with communication and medical decision making. Additionally, caregivers provide needed emotional support and serve as advocates for patients.
- The aim of this study is to describe the patterns of communication between healthcare providers and caregivers of hospitalized patients with heart failure or cancer who have been rendered remote by the visitor-restricted period of the COVID-19 pandemic and to investigate the potential impact of caregivers being remote on patient care and outcomes.

Methods

- 97 adult patients admitted to 6 hospitals in Maine for oncologic issues or heart failure exacerbations for 3 or more days between 3/25/20 and 5/30/20 with caregivers were randomly selected.
- Data were retrospectively collected from the electronic medical record.
- Statistical association was measured using odds-ratios and Chi-square difference tests (statistical significance at p value ≤ 0.05).

Results

- The sample was evenly divided between cancer and heart failure as the primary admission diagnosis.
- Most of the patients were white (93%), about half were men (51%) and the median age was 70 years old. The most frequent caregiver relationship was adult children (n=56), followed by spouses (n=41).
- **62 (64%) patients had documented communication between their care team and their caregiver. Among those 62 patients, communication occurred on just under half of the days the patient was admitted (44%).**
- **The primary mode of communication was by telephone with only 5 patients having documented videoconferencing communication.**
- 53 patients had at least one documented goals of care (GOC) conversation. **Patients whose caregivers were contacted during their admission were 4.5 times more likely to have a GOC conversation (OR=4.58, p=0.001).**
- 10% of patients visited the emergency department (ED) and 21% of patients were readmitted at least once within 30 days of discharge. **Patients whose caregivers were not contacted during their admission were almost 5 times more likely to visit the ED within 30 days of discharge (OR=4.92, p=0.018).** Readmission rates were similar irrespective of caregiver communication (21% vs 20%, p=0.910). ED visit and readmission rates are shown in Figure A.

Figure A

Conclusion & Ongoing Research

During the visitor-restricted period of the COVID-19 pandemic, lack of caregiver contact during hospital admission was associated with statistically significantly higher rates of 30-day post-discharge ED visits, but did not affect hospital readmission rates.

We will compare outcomes between this sample and a matched sample of patients hospitalized prior to the pandemic. We will also conduct qualitative interviews with 25 patients hospitalized during the pandemic and their caregivers to understand their experiences; how these experiences were impacted by the caregiver’s lack of physical access to the patient and the patients’ care team; and how care teams successfully involved “remote” caregivers.

among a Cohort of People Experiencing Homelessness

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INTRODUCTION

- 1,215 people experiencing homelessness in Maine in 2019
- Vulnerable population with unmet healthcare needs
- Higher rates of self-directed discharge and readmissions
- PSLC = Preble Street Learning Collaborative
- Discharge planning, such as scheduling follow ups, may help reduce readmissions

RESEARCH QUESTIONS

1. What is the impact of pre-discharge scheduled follow up on readmission rates among the PSLC cohort?
2. What is the impact of pre-discharge scheduled follow up on kept appointments?
3. What are the characteristics of the PSLC cohort?
4. What are the rates of readmission?

METHODS

- Retrospective Cohort– Chart Review
- Database Cohort: Anyone with at least 1 encounter with PSLC from January 2017 to July 2019
- Study Cohort: Inpatient encounter between January 1, 2018 to December 31, 2018
- Exclusion: Anyone not discharged home or shelter or street
- Levels of pre-discharge scheduling
 - Date Listed
 - Instructed
 - Provider Only
 - No follow up

RESULTS

212 patients (69% males) who experienced 319 hospital encounters
 146 (84%) White, 21 (10%) Black/African American, 12 (6%) Other

Outcomes

- No statistical difference in pre-discharge scheduled follow up on readmission rates
- Higher odds of keeping follow up if one is scheduled (OR 7.3, $p < 0.01$)

DISCUSSION

- Limitations: Single site, limited sample size, did not stratify complexity
- Pre-discharge scheduled follow up appointments more likely for longer LOS
- Discharge coordination is complex
- Scheduling follow up appointments may increase the odds of keeping/going to a follow up appointment
- Readmission rates were lower among those who kept or rescheduled their follow up appointments

Odds of readmission if kept follow up appointment (adjusted for age and sex)
 14-day (OR 0.52, 95% CI 0.3 - 0.9, $p < 0.05$)
 30-day (OR 0.7, 95% CI 0.46 - 1.16, $p > 0.05$)
 90-day (OR 0.6, 95% CI 0.39 - 0.97, $p < 0.05$)
 Length of Stay ($t = 2.3$, $p < 0.05$)
 Instructed or Date Listed mean LOS = 11 (SD 15.75)
 None Listed or Provider Only mean LOS = 5.9 (SD 11.25)