Aspiration thrombectomy of bilateral DVT in management of IVC Atresia: A case report

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Introduction

Inferior vena cava (IVC) atresia is a rare congenital anomaly which can cause unprovoked lower extremity deep vein thrombosis (DVT) in young patients. We report a case of a 24 year old female with a history of known IVC atresia and congenital absence of her left kidney presenting with bilateral iliac and lower extremity DVT. We discuss our management option for occluded bilateral DVT with known IVC atresia amendable to endovascular surgery.

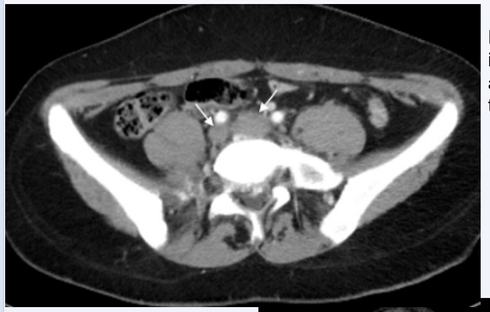

Fig 1. The bilateral iliac veins (arrows) are dilated due to thrombus

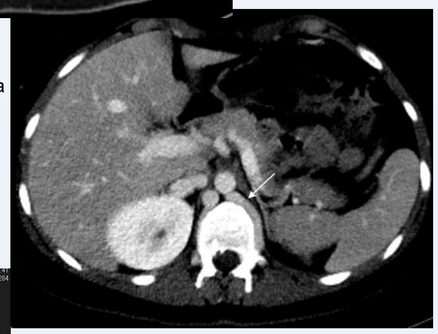

Fig 2. Collaterals fill into a patent but engorged hemiazygos (arrow) and azygos veins.

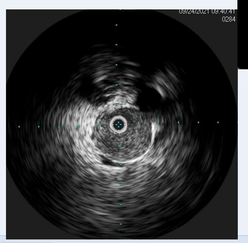

Fig 3. IVUS of iliac vein demonstrating extensive thrombus

Case presentation

•CT venogram showed an absent IVC abruptly occluding at the level of the iliac vein confluence with multiple collaterals and a dilated azygos vein. (Fig. 1, 2)

•The patient was taken for an aspiration thrombectomy.

-Bilateral popliteal veins were accessed under ultrasound guidance

-Intravascular ultrasound (IVUS) confirmed extensive thrombus (Fig. 3).

-20 Fr FlowTriever Inari sheath was used, multiple aspirations were performed

-On the initial venograms, the outflow of the venous system was not clear (Fig. 4), but after suction thrombectomy, the major outflow was noted to be a large azygos vein vs a large collateral off the iliac system (Fig. 5)

•Post-operatively, the heparin drip was transitioned to Eliquis. She was discharged on POD 2. At three weeks postoperatively, her bilateral lower extremity swelling was almost completely resolved, no cyanosis, and she was compliant with wearing compression stockings, elevating her legs, and taking Eliquis.

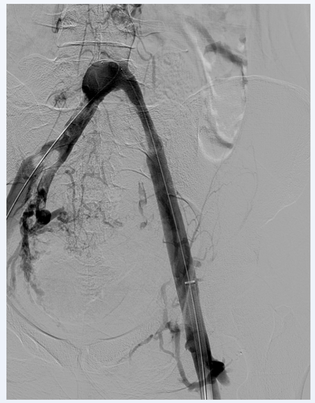

Fig 4. Digital subtraction angiography demonstrating no IVC was present but collaterals were seen off the iliac veins

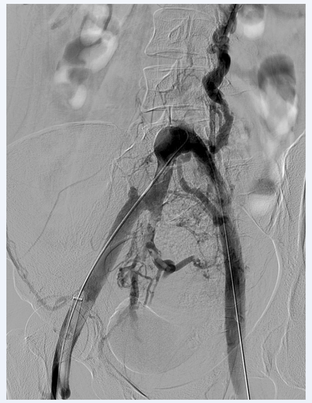

Fig 5. After thrombectomy, the major outflow was a large azygos vein vs a large collateral off the iliac system

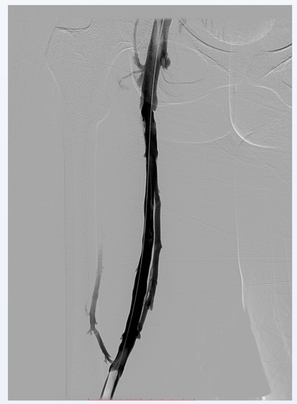

Fig 6. Completion venogram with minimal thrombus burden and brisk flow

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Discussion

•IVC atresia is an important etiology to consider in a young patient with an unprovoked DVT.

•One review spanning 21 years found 4.2% of DVT patients were found to have IVC atresia and most of these cases were bilateral DVT.[6]

•The compensation of an underdeveloped IVC can be found most commonly with a well developed azygos/hemiazygos continuation or an additional collateral network.[4]

•Most IVC anomalies are found incidentally but other non-specific symptoms include nausea, abdominal pain, back pain, or compressive symptoms.

•The optimal treatment and management of IVC atresia is understudied and unknown.

•Treatment options include conservative management, endovascular techniques including catheter-directed thrombolysis or as in our case, aspiration or mechanical thrombectomy +/- stent placement.

•Other options including IVC reconstruction have been proposed when initial endovascular treatments have failed.[3]

Conclusion

IVC atresia is a rare congenital venous anomaly which is associated with an increased risk of developing high burden lower extremity DVT at a young age. These patients may benefit from an endovascular treatment and lifelong anticoagulation and compression stockings as a safe and effective long-term treatment.

Assessment of social determinants of health on chronic disease outcome in patients at downtown Flint health center.

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Introduction

When practicing medicine there are multiple factors to consider, one of which is social determinants of health. Within our Downtown Flint Health Center Clinic, it is easy to get distracted by the fact that a patient may have arrived late, or that a patient may not be compliant with their medications. Realizing what social determinants of health may make physicians in our clinic more aware of out patient's population. For example, many physicians do not know that "Genesee county has been ranked 82nd out of 83 Michigan counties for overall health outcomes(1). In 2019, Genesee County had two different rankings- 1) healthy outcomes and 2) health factors. Health factors looked at clinical care, health behaviors, socio-economic factors. In health factor, Genesee County ranked 72 out of 82 in the state of Michigan, an improvement from 75 in 2018(1). Flint has one of the highest poverty levels in the nation with "45% of its residents living in poverty"(1). Out of 83 counties in Michigan our county ranked 27th in clinical care, 76 in health behavior, 82 in physical/environment and 71 in social/economic factors (1). Assessing social determinants of health, such as such as housing, transportation, easy access to health care, and food insecurity of patients, to name a few and incorporating those factors in patient care may help improve rapport with their physician, patients' compliance and overall improve patient satisfaction and chronic disease outcome. For my research, I will be using a standardized tools, e.g. used by Genesee County Community Health Access Program (CHAP), which was modified to fit our patient population to help collect data from patient population at downtown Flint health center. This research is a cross-sectional study, that had an informed consent prior to filling out the questioner.

Hypothesis

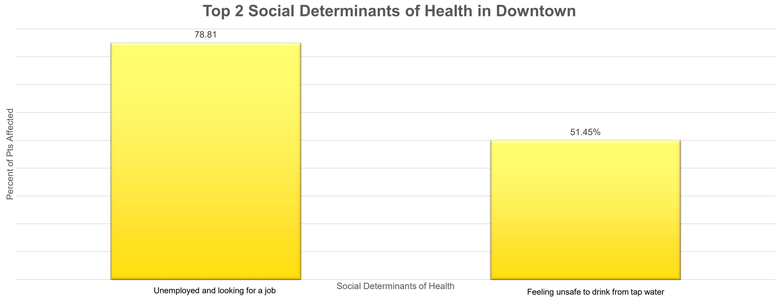
Which social determinants of health is most prevalent in patients at downtown Flint Health Center?

Methods

This is a cross-sectional study, that was held in the Downtown Flint Health Center. Inclusion criteria included patients 18 years and older, patients of all ethnic background, male and female patients, and any or all health conditions. Exclusion criteria included patient who cannot read, if there was a language barrier, if they did not have the mental capacity to fill out the surveys, based on MA's and front desk judgement on their mental capacity. Therefore, after this was determine, the study was given to patient when they checked into their appointment at the clinic. They were given the consent form and survey in a folder. If they agreed to be in the study then they would fill the surveys out during their clinic visit. Once completed they were given to the Medical Assistant, who then placed it back with all the other surveys in a secure location. If a participant answered "yes" to any following questions and wanted more information, there was a binder in the clinic that had information regarding food, housing, etc. There was a sign in front of the front desk that made this assessable for patient to use. The surveys once all completed where entered into RedCap. The surveys were taken from September 2019 to December 2019. Prevalence of factors identified by Genesee Community Health Screening was analyzed descriptively by item frequency and percentages. Individual items (questions) were categorized by most to least frequency. In addition, overall social needs were quantified descriptively by reporting the frequency of those reporting at least one social need and two or more needs. The estimated overall percentage is 28% having at least one and a sample size of 100 to 200 is required to achieve representativeness of the sample.

Results

The mean age was 47.6 (SD: 14.9) years old. There were 233 (65.1%) females and 125 (34.9%) males. The majority of respondents were white (n=209, 57.3%) followed by African American (n=120, 32.9%). There were 27 (7.4%) who reported other, 4 (1.1%) who reported American Indian or Alaskan Native, 4 (1.1%) who reported Asian, and 1 (0.3%) person who reported Native Hawaiian/ Other Pacific Islander. There were 201 (52.9%) who had Medicaid insurance, 71 (18.7%) who had commercial insurance, 91 (23.9%) patients who had Medicare insurance. There were 64 (17%) respondents who reported yes, when asked if in the last 12 months they ate less than they felt they should because there wasn't enough money. Twenty two (5.83%) responders who reported yes, when asked if in the last 12 months has their utility company shut off service for not paying any of their bills. There were 25 (6.63%) responders who reported no , when asked if they have access to tap water. A hundred and twenty four (51.45%) responders reported no, when asked if they feel safe drinking from tap water. There was 33 (8.75%) responders who reported yes, when asked if they were worried that in the next 2 months they may not have stable housing. Fifteen (3.98%) responders who reported yes, when asked if they are afraid, they might be hurt in their apartment building or house. Eighteen (5.05%) of responders reported yes, when asked if problems getting childcare make it difficult for them to work or study. There was 156 (42%) of responders who reported yes, when asked if they are currently unemployed. Eighty three (73.81%) of responders reported yes, when asked if there are currently unemployed and if they are actively looking for a job but cannot find one. There was 20 (5.39%) of responders who reported yes, when asked in the last 12 months had they needed to see a doctor but could not because of the cost of medical bills. Twenty seven (9.81%) of responder reported yes, when asked if in the last 12 months had the lack of transportation kept them from medical appointments. There was 34 (9.07%) of responders who reported yes, when asked if in the last 12 months the lack of transportation has kept them from getting things needed for daily living. Twenty one (5.61%) of responders reported yes, when asked if they ever need help reading information from their doctor. There was 33 (8.9%) of responders who reported yes, when asked if they wanted help with school or job training, like finish a GED, going to college or learning a trade. Six (1.59%) responders reported yes, when asked if they were interested on alcohol and/pr drug misuse (including prescription drugs). The mean number of needs was 2.5 (SD: 1.7), the range was 0-12. There were 28.7% (n=109) of respondents had either 0 or 1 need. There were 71.3% (n=271) respondents who had 2 or more needs.



Discussion

This study helped show us multiple things in terms of our patient population in the Downtown Flint Health Center. Most importantly that patients not only come to the physician for a medical concern but also may have a social determination of health that is limiting them for getting what they need medically. Limitation such as drinking from tap water, being unemployed and trying to find a job are all important to a patient's overall wellbeing. With Downtown Flint Health Center being a residency driven outpatient office, this study was also helpful in noting that transportation, not understanding that reading material that is give during appointments, food and water, etc, are limitation to our patient population that we as Physician's may not consider at a follow up or health maintenance appointment. These results have made us aware that the Downtown Flint Health Center 71.3% of our patient population have 2 or more needs. Knowing the above results, and now being able to address these at a patient's visit may help break down the barriers of social determinants of health.

Conclusion

The top 2 social determinants of health in the Downtown Flint Health Center were found to be unemployment and money issues.

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Association between Environmental Factors and Gestational Diabetes in Flint Michigan

By: Jessyca A. Judge MS3, Caitlin B. Heenan MS3, Abdelrahman Yousif PGY-3, Richard Sadler PhD, Michigan State University College of Human Medicine

Background

- Gestational diabetes mellitus (GDM) is a serious maternal complication in which women without diabetes develop hyperglycemia during the second half of the pregnancy. GDM affects both maternal and fetal outcomes; mothers are at higher risk for future type 2 diabetes and cardiovascular diseases development[1], meanwhile infants are at increased risk of developing obesity and Type 2 diabetes in childhood[2]. There are many known predisposing factors such as obesity, history of diabetes, family history of gestational diabetes, and advanced maternal age[2].

- Environmental factors such as food security seem to be related to gestational diabetes, but results are mixed. Poor access to food and groceries has been associated with higher rates of GDM[3-7], however there is also evidence that living in a food insecure area is associated with less GDM[8,9]. Gestational diabetes is prevalent in the Flint, MI community, making it important to understand associations between built environmental variables and developing gestational diabetes. Flint is considered a food desert, with much of the city positioned more than one mile from the nearest grocery store.

Methods

- This retrospective cohort study will consist of a chart review of all patients who delivered at Hurley Medical Center in Flint, Michigan who were diagnosed with GDM.

- Geographic information systems (GIS) maps can be used to show the prevalence and distribution of built environmental factors. We will be examining the following built environment variables: chronic health conditions, healthfulness, socioeconomic status, access to food, proximity to public transportation, incarceration rate and walkability.

- Study personnel will aggregate the data of pregnancy outcomes of subjects with GDM and compare them to zip code of residence, to assess for an association between built environmental factors and the occurrence of gestational diabetes in Flint, MI.

College of Human Medicine
MICHIGAN STATE UNIVERSITY

Data Analysis

- The below maps are a sample of the built factors which will be investigated as part of this project. These maps depict Flint broken into neighborhoods and analyzed according to factors related to the built environment. Healthfulness is defined according to categories including amenities, environment, greenspace, housing, infrastructure, and social issues.

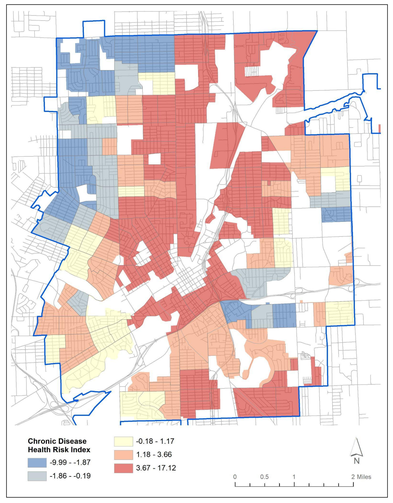

Figure 1: Chronic Disease Health Risk Index. This figure shows areas of Flint in which residents are more or less likely to be at risk for chronic health conditions, with negative indexes in blue indicating areas that less likely and higher positive indexes in red being more likely at risk.

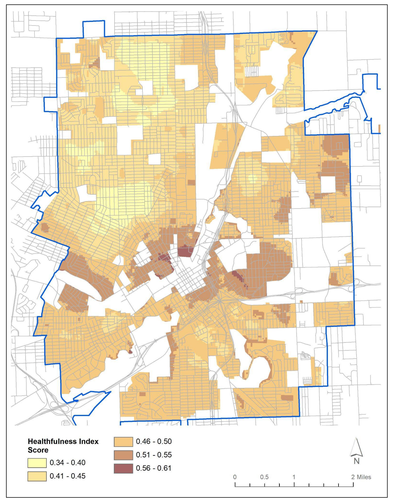

Figure 2: Healthfulness Index Score. This figure shows areas of Flint in which residents experience conditions that are more or less favorable to health, such as …., with higher indexes in brown indicating more healthful areas.

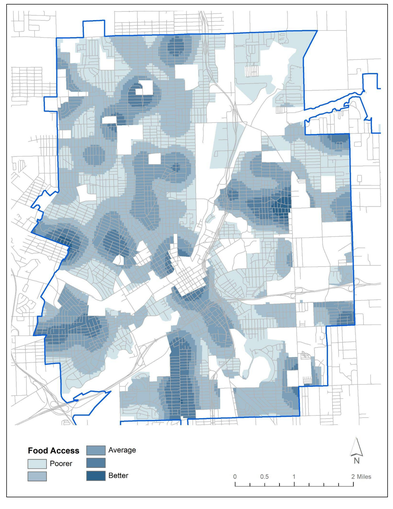

Figure 3: Food Access. This figure shows areas of Flint with respect to how readily accessible healthy food is, with darker blue indicating better access to food.

Age	**Zip Code % (N)**
Range: 14-46	48458: 5% (17)
Average: 28	48503: 10% (37)
Race	48504: 12 (46)
White: 191	48505: 10% (36)
Black: 166	48506: 10% (38)
Hispanic: 9	48507: 13% (52)
Asian: 5	48532: 5% (20)
Asian Pacific Islander: 1	Other: 35% (145)
Other: 10	
Unknown: 1	
Smoking Status	
Never Smoker: 87	
Current Smoker: 57	
Former Smoker: 56	
Unknown: 191	**TOTAL: 391**

Table 1: Demographic Data. This table shows the demographic information for each of the 391 pregnant people whose data will be evaluated in this study.

Conclusions

- We anticipate results showing a relationship between GDM in any pregnancy and residency in a zip code with poor environmental factors such as poor access to food, low levels of healthfulness, high levels of distress, and high levels of chronic disease.

- With this research, we hope providers will better understand environmental factors in GDM development amongst pregnant people and be able to better connect patients to resources in the community that limit their exposure to these factors.

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Biomechanical considerations for computer simulations of femoral neck fractures treated with cannulated screw fixation: mechanical analysis of iatrogenic subtrochanteric fracture

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Background

Femoral neck fractures are common with a bimodal distribution of younger patients suffering high energy events like MVC's while the elderly typically suffer a low energy event such as ground level fall. Such fractures require urgent assessment and treatment to restore the blood supply to the femoral head. Treatment typically involves the use of internal fixation devices to stabilize the bone until the fracture heals via bony union. One common fixation device is the use of 3 cannulated screws inserted in the neck and crossing the fracture plane. While this treatment has a high success rate, one complication described in the literature is an iatrogenic femoral fracture in the subtrochanteric region. While rare, this complication is devastating and requires additional assessment and treatment. It is hypothesized that the inferior starting point creates a stress riser that initiates the subtrochanteric fracture. The objective of the current study is to conduct a systematic review of the literature to develop guidelines for computer simulations which can elucidate the state of the stress in the subtrochaneric region.

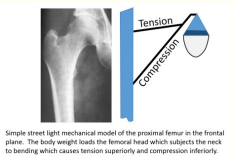
Methods

An extensive survey of the available clinical, experimental, and simulation literature was conducted to identify the current state of knowledge on the principles for the placement of the screws to treat a femoral neck fracture. The findings were synthesized within the context of developing a computer simulation to address the central research question.

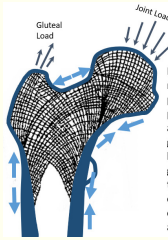
Results

The use of cannulated screws began approximately 40 years ago. Shortly thereafter, there were clinical reports of iatrogenic subtrochanteric fractures in the early 1980's. In the coming years, it was confirmed that the three screws should be placed as a triad made up of an equilateral triangle with the apex pointing inferiorly. This position essentially optimizes the placement of the screws into the denser bone in the femoral head. Placing the screws parallel allows the fracture to compact during screw insertion and in the subacute stage of healing. It is also recommended to place the screws perpendicular to the fracture plane, however, shallow angle fracture planes (eg more horizontal), would necessitate a more valgus placement of the screws. Experimental studies show that this position, while optimized for fracture fixation and healing, caused an iatrogenic subtrochanteric fracture in 30% of cases with osteoporotic bone. This fracture did not occur in any experiments simulating healthy bone. This finding is relevant in light of the clinical reports which note that 90% of patients suffering iatrogenic subtrochanteric fractures are in patients older than 65 years of age.

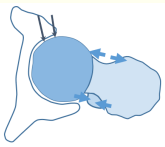
Figures



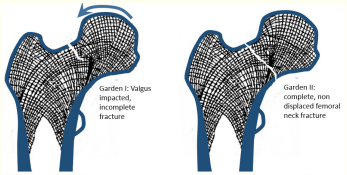
Simple street light mechanical model of the proximal femur in the frontal plane. The body weight loads the femoral head which subjects the neck to bending which causes tension superiorly and compression inferiorly.



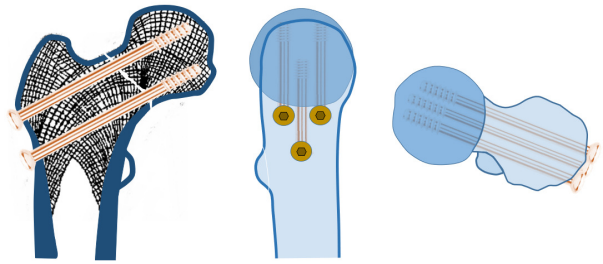
More realistic anatomic-mechanical model of the proximal femur in the frontal plane. The Joint load is angled inferolaterally and the greater trochanter is loaded by the Abductor muscle group. While the loading of the bony tissue is complicated, it is essentially compressive inferomedially and tensile superolaterally.



In the axial plane, the combination of muscle and joint forces, create an overall posterior force acting on the femoral head while arising from a seated position or ascending stairs. This loading causes compression along the posterior neck and tension anteriorly.

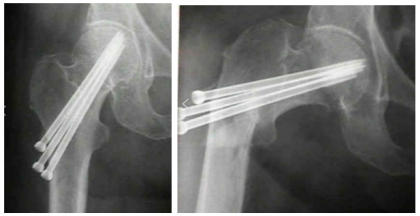


1961: British Orthopaedic Surgeon Robert Garden proposed the Garden Classification for femoral neck fractures: Garden fractures I and II had a very good likelihood of healing. As such, surgeons typically attempt to repaair these fractures. (In the more severe Garden II and IV fractures, the proximal femur is less likely to heal and thus is typically replaced with an implant).



Inferior Screw Starting Point

Generally accepted rule:
Screw holes should not start below the lesser trochanter to avoid iatrogenic subtrochanteric fracture.



Results (cont'd)

There is some controversy on the influence of extra holes that may be made during the surgical procedure and the influence of the height of the inferior most hole. A number of authors recommended the use computer simulations to compute the state of stress in the bone to provide insights not available via clinical or benchtop experimentation.

Discussion and Conclusions

Computer simulations should focus on the analysis of the elderly since the complication is apparently limited largely to patients >65 years. One of the limitations of the experimental studies in the literature is variability in the specimens used in testing, ranging from cadavers to a variety of synthetic bone analogs. The loading is also variable to assess the mechanical stability. Simulations should subject the repaired construct to standing loads and AP loading to evaluate arising from a chair and stair ascension activities. These loading modes are considered realistic loading modes which challenge the integrity of the fixation construct. Screw patterns should all be the triad with the apex distal. A control simulation would represent the ideal position with the fracture plane aligned perpendicular to the screws. By decreasing the fracture plane angle the screw pattern lateral starting points would move inferiorly, thus evaluating bone stresses for an inferior screw. An additional simulation could add a fourth, distal hole to the control simulation. This additional hole would represent the creation of an inadvertent inferior hole that was abandoned once it was discovered it was too inferior. This low screw hole could then be studied by filling it with a screw or nothing. Collectively, these simulations would help elucidate the influence of the distal most screw on the iatrogenic subtrochanteric fractures.

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A Case of Myocarditis Post COVID-19 Vaccination

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Abstract

Analyses of CDC vaccine data shows an increased risk of myocarditis/pericarditis events among individuals 12 to 39 years of age in the 7-day risk interval after vaccination with mRNA COVID-19 vaccines compared with unvaccinated individuals or individuals vaccinated with non-mRNA COVID-19 vaccines on the same calendar days (rate ratio of 10.8 [95% CI, 3.2–49.0], adjusted for site, age, sex, race/ethnicity, and calendar date). The estimated rates observed were 12.6 cases per million doses with second-dose mRNA vaccine among individuals 12 to 39 years of age. In this case study, we discuss the case of an adolescent who presented with myocarditis post mRNA vaccination.

Myocarditis

- Myocarditis is an inflammatory disease of the myocardium.
- Patient with myocarditis usually presents with clinical history suggestive of acute decompensation of heart failure.
- Myocarditis can be caused by a wide variety of conditions including infectious and noninfectious causes.

Mechanism of Action

- The proposed mechanism is that the immune system of the body stimulates inflammation in response to certain triggers or infection. It is also thought that this inflammation leads to the development of antibodies against a patient's own heart cells in a process known as "molecular mimicry". This leads to a phenomenon whereby the mRNA vaccines directed against the spike protein of the COVID-19 virus attack proteins on the surface of the heart cells with similar molecular resemblance.

Common Symptoms

- Chest pain/palpitations
- Diaphoresis
- Shortness of breath
- Fatigue/weakness
- Fever

When Should Myocarditis Be Suspected?

- Suspect myocarditis in patients with or without cardiac signs and symptoms in addition to presence of elevated cardiac biomarkers levels, ECG changes of acute myocardial injury, arrhythmia, or ventricular systolic function abnormalities especially in a setting where the clinical findings are new and unexplained.
- Post mRNA COVID-19 vaccination pericarditis can co-exist with myocarditis.

Case History

- A 17-year-old male presented to the ED with complaints of substernal chest pain of 2-day duration. The patient reported chest pain that was 8/10 in intensity, dull in nature, non-radiating, intermittent, lasting for an hour and improving gradually without any intervention. Patient reported no known associated aggravating or alleviating factors. He reported the chest pain was associated with shortness of breath, nausea, dry heaving, and abdominal pain. He also reported fevers with associated chills. He denied any lightheadedness, blurry vision, recent illness, rhinorrhea, or cough. He has a medical history of ADHD and benign physiological childhood murmur that self-resolved. He received his Pfizer booster vaccine four days prior to admission. His first dose of Pfizer vaccine was 6 months prior in which he did not experience any reactions or complications. His COVID-19 test at admission was negative.

Differentials

- Acute coronary syndrome – ECG – ST elevations and depressions in contiguous leads. No echocardiogram findings of wall motion abnormalities.
- Pulmonary embolism – ECG showed S1Q3T3 but normal d-dimers labs and normal CT angiogram.
- Pericarditis – no friction rubs on physical exam, no EKG changes of pericarditis, normal inflammatory markers including ESR.
- Pericardial effusion – normal CXR findings, physical exam findings and no abnormal echocardiogram findings.

1

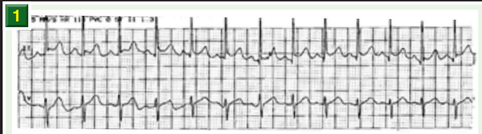

Fig. 1: Telemetry strip readings showing sinus tach and ST-elevated changes.

2

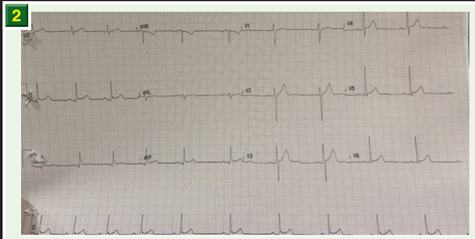

Fig. 1: EKG Day 3 showing: ST-Elevations and high voltage criteria.

3

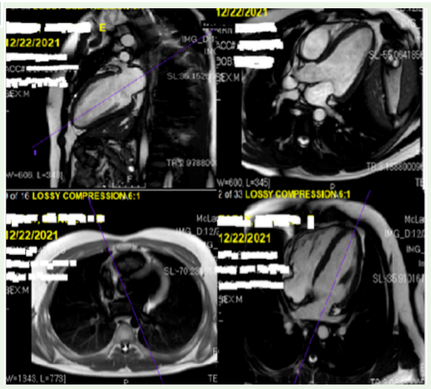

Fig. 3: Cardiac MRI 4 days after admission – Showed moderate subepicardial and mid-wall delayed enhancement in the mid inferolateral and basal inferior wall and areas of adjacent pericardium consistent with peri myocarditis.

4

CDC Working Case Definitions

Acute Myocarditis		Acute Pericarditis
Probable Case	**Confirmed Case**	**Probable Case**

• Presence of ≥ 1 new or worsening of the following clinical symptoms
  • chest pain/pressure/discomfort
  • dyspnea/shortness of breath
  • palpitations
  • syncope
• AND ≥ 1 new finding of
  • elevated troponin above upper limit of normal
  • abnormal ECG or rhythm monitoring findings consistent with myocarditis
  • abnormal cardiac function or wall motion abnormalities on echocardiogram
  • cardiac MRI findings consistent with myocarditis
• AND no other identifiable cause of the symptoms and findings
	• Presence of ≥ 1 new or worsening of the following clinical symptoms
	  • chest pain/pressure/discomfort
	  • dyspnea/shortness of breath
	  • palpitations
	  • syncope
	• AND
	  • histopathologic confirmation of myocarditis
	  • OR
	  • elevated troponin above upper limit of normal AND cardiac MRI findings consistent with myocarditis
	• AND no other identifiable cause of the symptoms and findings
		• Presence of ≥ 2 new or worsening of the following clinical symptoms
		  • acute chest pain (typically described as pain made worse by lying down, deep inspiration, cough, and relieved by sitting up or leaning forward, although other types of chest pain may occur)
		  • pericarditis rub on exam
		  • new ST-elevation or PR-depression on ECG
		  • new or worsening pericardial effusion on echocardiogram or MRI
		• Autopsy cases may be classified as pericarditis on basis of meeting histopathologic criteria of the pericardium

Fig. 4: Despite rare cases of myocarditis, the benefit-risk assessment for COVID-19 vaccination shows a favorable balance for all age and sex groups. {"COVID-19 mRNA vaccines in adolescents and young adults}. Adapted from Centers for Disease Control and Prevention.

ED Day 1

Vitals:

BP: 137/77, Sp02: 100% on RA, Pulse: 99, RR: 18, Temp: 100.2°.

Laboratory Findings

- CBC wnl.
- CMP wnl.
- Troponins x2 were upward trending – {0.034➡>0.047}.
- D-dimer 0.25.

Images

- EKG showed ST elevations, S1Q3T3, high voltage QRS complexes and sinus tachycardia.
- CXR showed no acute process
- CT angiogram – normal findings.

Day 2

- ESR and ferritin wnl.
- CRP >300.
- CCTA ordered.
- Echocardiogram – no regional wall motion abnormality or pericardial effusion, Ejection fraction of 60–65%.
- Telemetry showed irregular heartbeats with PACs, Repeat ECG was completed which showed similar findings with diffuse ST elevations and PR depression.
- Upward trends of Troponin {0.034➡0.047➡ 1.009➡ 1.4770➡ 3.5990}.
- Colchicine, aspirin, and ketorolac were started.

Day 3

- CCTA – Total calcium score was 0 with normal coronary arteries.
- Cardiac MRI ordered.
- Patient's symptoms resolved with medications.
- PAC's and Sinus Tach resolved.
- Prior to discharge: Normal ejection fraction on echo, No heart failure symptoms on physical exam or lab/imaging.
- Follow-up appointment at cardiology clinic scheduled for taper of medications.
- Discharged home on high dose aspirin, colchicine, and Protonix for GI protection.

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Treatment Recommendations

- In published case reports, supportive care, NSAIDS, steroids, and colchicine were used for management of some of the patients with myocarditis after COVID-19 vaccination.
- A few patients were treated with intravenous immunoglobulin and aspirin, and some were initiated on ß-blocker and angiotensin-converting enzyme inhibitor therapy because of left ventricular systolic dysfunction. Although there are no prospective or randomized studies, it is reasonable to consider these therapies, especially in patients with significant symptoms and findings.
- American Heart Association and the American College of Cardiology guidelines advise that patients be instructed to restrict or defer strenuous physical activity and competitive sports until after complete resolution of symptoms, rhythms, diagnostic and biomarker abnormalities.
- If a person develops myocarditis or pericarditis after the first dose of an mRNA vaccine, CDC recommends that their second dose be delayed and that the second dose be reconsidered on resolution of symptoms, signs, and findings, under certain circumstances.
- CDC recommends that all cases of myocarditis and pericarditis post-COVID-19 vaccination be reported to VAERS (Vaccine adverse event reporting system).

Discussion/Take Home Points

- According to the CDC, myocarditis reported rates were 40.6 cases per million with second doses of mRNA COVID-19 vaccines administered to males aged 12–29 years. The highest reporting rates were among males aged 12–17 years (62.8 cases per million-second doses of mRNA COVID-19 vaccine administered). This is compared to the prevalence of 1/20,000 for the 16 to 30 age group in the general population.
- The Israeli Ministry of Health reported approximately 148 myocarditis cases among 10.4 million vaccinated individuals occurring within 30 days of mRNA vaccination.
- Cases of myocarditis reported after COVID-19 vaccination were typically diagnosed within days of vaccination, whereas cases of typical viral myocarditis can often have indolent courses with persistent symptoms if the cause is ever identified.
- The major presenting symptoms appeared to resolve faster in cases of myocarditis after COVID-19 vaccination than in typical viral cases of myocarditis.
- Among various published case reports and case series of myocarditis after COVID-19 vaccination, almost all individuals were hospitalized and monitored clinically. One hundred percent of the patient's symptoms resolved. This is in comparison to typical viral cases of myocarditis which can have variable clinical course outcomes.
- Published case studies have shown that up to 6% of typical viral myocarditis cases in adolescents require more severe complications including heart transplants and mortality.
- There are currently no long-term outcome data for COVID-19 vaccine myocarditis cases. The CDC does have an active surveillance system through the VAERS.
- Despite rare cases of self-limited myocarditis, the benefit-risk assessment for COVID-19 vaccination shows a favorable balance for all age and sex groups. The risk-benefit decision remains overwhelmingly favorable for vaccination.
- More research is needed to better ascertain the long-term outcomes.

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Characterization of Bioimpedance Measurements of the Knee in Healthy Subjects

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Introduction

- No clear set of criteria determines when an athlete has recovered sufficiently from a knee ligament injury and can return to play, however, there is a broad consensus that joint effusion should be minimal to none [4]. Therefore, successful patient management relies on a clinician's assessment of post-operative swelling in the lower limb [1,3,5,7].
- One tool that can be used to make an objective measure of swelling is a bioimpedance meter. Single frequency bioimpedance (SFBIA) measurements provide resistance and reactance measurements by delivering a weak 50 kHz current across the body. The resistance is associated with the amount of extracellular fluid present in the sensing region and the reactance refers to the delay in conduction due to cell membrane or tissue interfaces [2,6].
- Studies have suggested that bioimpedance may be helpful in monitoring healing in athletes, but there is limited data for a healthy baseline in identifying knee swelling for young patients.
- Therefore, the purpose of this study is to document knee bioimpedance measurements in healthy, young subjects along with a clinical knee function score that can be used in monitoring knee injuries in younger patients.

Materials & Methods

- All eligible subjects were asked to self-report sex, age, height, weight, and limb dominance as well as complete a Knee Injury and Osteoarthritis Score (KOOS Jr.). This survey is commonly used to evaluate knee pain and function in orthopedic patients and consists of 7 questions scored on a scale of 0-4, with a maximum score of 28 points which is indicative of excellent knee function.
- Next, an RJL Systems Quantum Legacy Body Composition Analyzer was used to measure resistance and reactance values across the knee of both legs in the healthy subjects. One set of electrodes were placed on the dorsum of the foot beneath the second and third digits and on the ankle bisecting the medial malleolus. The other set was placed on the midpoint between the greater trochanter and proximal pole of the patella and 10 cm distal to the first. Additionally, thigh circumference measurements of both legs were taken to keep track of swelling measurements taken in previous studies.

Results

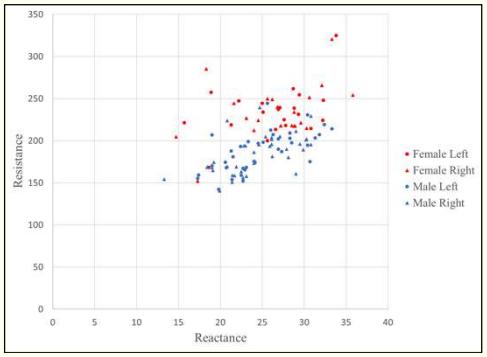
- Similar to previous studies, our data verified that women tend to have significantly greater resistance values compared to men and, therefore, have greater overall bioimpedance values (Table 1, Fig 1).
- For subjects of all ages, there was a slight decline in the impedance values with increasing age and BMI. Additionally, higher KOOS Jr Scores were indicative of higher impedance values, with this trend more pronounced in the data from women.
- Furthermore, a multiple linear regression showed a predictive model for the percent difference for impedance where sex and KOOS were found to be significant with a p-value of 0.027 and 0.012 respectively with an overall power of 92.7%.

Table 1

	Male		Female	
	Average	Standard Deviation	Average	Standard Deviation
Age	20.47	2.24	21.1	1.99
BMI	26.86	4.80	23.77	4.09
KOOS Jr Score	26.4	2.98	26.2	3.04
Right Leg Resistance	185.15	23.57	233.59	34.07
Right Leg Reactance	25.59	3.45	26.49	5.45
Right Leg Impedance	186.94	23.67	235.15	34.14
Absolute Difference	5.88	4.39	11.12	7.64

Average and standard deviation for age, BMI, KOOS Jr Scores, and bioimpedance data for participants under 30 years old in males versus females.

Figure 1



Resistance versus reactance data for each limb in males versus females.

Discussion

- The subject KOOS Jr Score and sex were associated with the limb to limb percent difference in bioimpedance, with women showing greater limb to limb differences with lower KOOS Jr scores, indicative of worse knee function.
- This suggests that using the contralateral limb as a target for assessing baseline swelling may not be appropriate, as patients who are female and have lower limb function have larger limb to limb differences.
- This may also suggest that chronic swelling may be a factor in subjects with lower KOOS Jr scores. This effect was less obvious in the data from men, which may reflect a difference in physiology or may be due to the relatively small sample size for this study.

Conclusion

- To determine whether the difference between men and women is due to a difference in physiology or a small sample size, further data collection and analysis are planned. This may help define how to best utilize bioimpedance and KOOS Jr scores when determining an athlete's ability to return to play after an ACL injury.

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Reasons for COVID-19 Vaccine Hesitancy in Black Pregnant People

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Introduction

The COVID-19 pandemic has been a major public health crisis for over two years. Pregnant people have double the risk of ICU admission and a significantly increased risk of death from COVID-19 compared to the nonpregnant population[1]. Black pregnancies in particular have demonstrated higher rates of maternal complications or death from COVID-19 infection[2]. Vaccination rates are the lowest amongst Black pregnant people at 53.8% compared to 66.6% of white pregnant people[3].

The purpose of this study is to assess possible differences in factors influencing COVID-19 vaccination rates between Black and non-Black pregnant individuals using the Health Belief Model. This information may help to identify new approaches to addressing vaccine hesitancy for Black individuals.

Background

- Black pregnant individuals have lower vaccination rates compared to other racial groups[3,4,5]
- Reasons for declining vaccination included low concern of catching COVID-19, concern that the vaccine will make them infertile, or fear that the vaccine will harm the fetus[4,5]
- Reasons for accepting vaccination included concern of infecting others, concern for getting COVID-19 and passing it to the fetus, or reassurance from available safety data[4,5]
- The Health Belief Model has been used to assess reasons for influenza vaccination hesitancy such as threat to self or efficacy of vaccination[6], and may provide a good framework to determine primary reasons for COVID-19 vaccine hesitancy.

Methods

- Participants for this study are postpartum people 18 years of age and older on the Mother-Baby unit of Hurley Medical Center.
- Approximately 200 participants are anticipated.
- Questionnaires are distributed in individual patient rooms 2-5 times weekly via flyers with a QR code and a tiny URL that link to the virtual survey
- Data will be stored in Hurley Medical Center's Google Drive and analyzed using SPSS software
- Data will be analyzed with both descriptive and inferential analysis. We will look at associations between patient characteristics and reasons for vaccination hesitancy.

Anticipated Results

- This project has been approved by the Institutional Review Board of Hurley Medical Center
- Survey distribution and data collection has been initiated
- **Current challenge:** low survey response rate
- **Proposed solutions:** increase frequency of distribution from twice weekly to as many as five times weekly, include possible incentivization

Early Results: Health Beliefs Most Important to Participants

Among those who chose to vaccinate	<u>Perceived benefits:</u> • Protection for me or my baby • Concern for long term effects of infection with COVID-19 <u>Self-Efficacy:</u> • Easy or convenient to get vaccinated
Among those who chose not to vaccinate	<u>Perceived barriers:</u> • Lack of research indicating vaccine is safe in pregnancy • Personal or religious beliefs • Previous bad reactions to vaccines

Conclusions

- Increasing survey response rate will provide for faster, more robust results
- Early results already suggestive of possible targets for improving vaccine acceptance, but more data is needed
- We expect to identify potential causes for lower rates of COVID-19 vaccination in Black pregnant individuals

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Crash characteristics for classic/historic vehicles and comparisons for newer vehicles

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Introduction

- There has been an overall decline in the number of vehicle deaths in the last 20 years in the United States which have been attributed to road design, car design, and laws.[1,2]
- Despite these conditions continuing to improve, older style vehicles with less-than-optimal safety systems continue to share the roadways with newer vehicles. These older vehicles are commonly referred to as “classic,” “vintage,” or “historic” vehicles (CVH). Special events and organizations across the United States (US) allow owners of these CVH to share their common interests and love of these vehicles, however there are no recommendations on the safe operation of these vehicles as to reduce the risk of severe injury or fatality.
- There is some data to suggest that the risk of fatality is higher for occupants in older vehicles involved in crashes, however there is no study examining the frequency and typical conditions for crashes involving CVH. [3,4]
- This study seeks to evaluate the crash frequency, crash event characteristics, and occupant factors related to fatality risk for crashes involving CVH vehicles.

Materials & Methods

- This study utilized information from crashes occurring in 2012 to 2019 to estimate fatal crash rates for vehicles grouped by model year deciles. Data from crashes occurring in 2016 to 2019 were utilized to examine roadway, temporal, crash type factors associated with crashes involving CVH. The CVH group was defined as passenger vehicles from production year 1970 or earlier.
- This data was extracted from three data sets maintained by the National Highway Traffic Safety Administration (NHTSA): Fatality Analysis Reporting System (FARS), the National Automotive Sampling System (GES), and crash Report Sampling System (CRSS). All fatal crashes in the US are recorded in the FARS sample and overall crash incidence was estimated using weighting factors in the GES/CRSS data. The incidence of a fatality crash, or risk of a range outcomes, were compared to the risk in newer vehicles using relative risk. A chi-square test (or Fishers Exact test when case counts were below 5 for CVH) was used to identify statistically significant differences in frequencies of events between CVH and newer vehicles.

Results

- An estimated 0.2-0.6% of crashes involve CVH. The relative risk for involvement in a fatality crash in CVH compared to newer vehicles ranged from 4.73 (95th CI: 3.39-6.60) for impacts with other vehicles, which was the most common crash, to 19.95 (12.33-18.12) for rollovers.
- When considering road and environmental conditions, most crashes occurred in dry weather, 2 lane roads, roads with speed limits between 30 and 55 mph, and during summer months.
- Factors which increased the risk of fatality for occupants in CVH included alcohol use, lack of seat belt use, and older age.

Figure 1

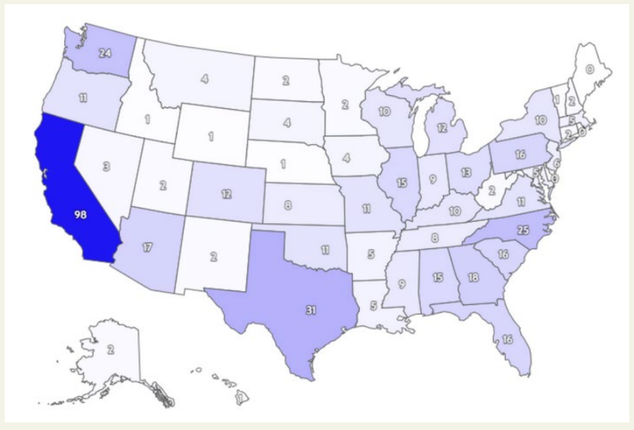

Figure 1: Locations and counts of fatal CVH vehicle crashes from 2012 to 2019.

Figure 2

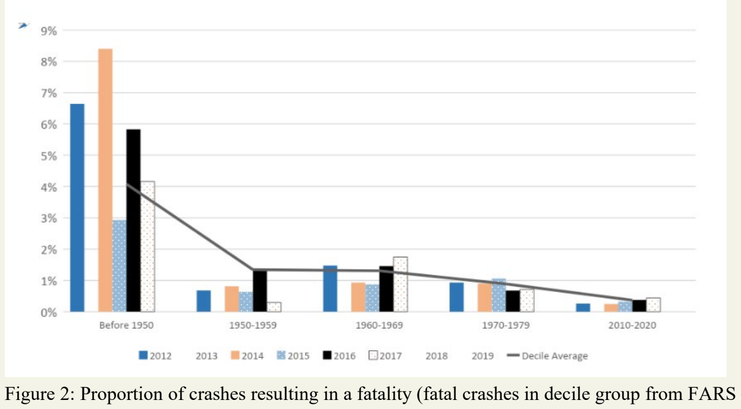

Figure 2: Proportion of crashes resulting in a fatality (fatal crashes in decile group from FARS / all crashes in decile group as estimated from GES or CRSS), with the mean for each decile indicated by the solid line.

Discussion

- The present study aims to examine the frequency of crashes involving CVH vehicles in the United States, with special attention to the type of crash and roadway conditions associated with these events.
- Crashes involving CVH most frequently involve impact with another vehicle and occur in rural areas in summer months on dry pavement. Occupants of these vehicles experience injuries due to the crash more frequently than occupants in newer vehicles.
- While crashes involving CVH are rare events, these crashes lead to a higher relative risk of fatality as compared to newer vehicles. Alcohol, lack of seatbelt use, and age were factors associated with fatalities in a CVH crash event.

Conclusion

- Crashes involving a CVH are a rare event but continue to have catastrophic consequences when they do occur. Multiple road, environment, and occupant risk factors were found to increase risk of fatality when involved in a crash while operating a CVH. These findings can help identify, predict, and prepare for these unfortunate events and provide recommendations for safe operation of these vehicles.

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The Differential Diagnosis of Retropharyngeal Fluid: Calcific Tendonitis of the Longus Colli Muscles

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Abstract

The differential for acute neck pain, fever and photosensitivity is vast. Due to the low incidence of Acute Calcific Longus Colli Tendonitis, this diagnosis takes a back seat to more common pathologies such as meningitis, retropharyngeal abscesses, neoplasia and more

With such minor differences between these differentials, being able to identify ACTLC in the proper situations expedites patient care, decreases the diagnostic timeline and tailors treatment plans to the conservative approach that this diagnosis constitutes

Teaching Points

1.Being able to appropriately identify ACTLC expedites patient care while limiting use of extraneous resources not indicated in the work up of ACTLC

2. Radiographic presentation of a rare diagnosis that presents with pathognomonic findings of calcification and edema seen in ACTLC

3. The minor details differentiating various head and neck pathologies can be discerned via MRI

Case

A 54-year-old woman with a history of viral meningitis and IBS presents to the ED with a history of progressive acute neck pain, headache and fever of 101F for 4 days

Patient had no sick contacts but did have lunch with asymptomatic friends who recently traveled to Africa. Patient denied trauma, shortness of breath, and diarrhea but endorsed photophobia, nausea and vomiting The patient reported her current symptoms were similar to those of her previous viral meningitis diagnosis

Physical Exam:
Respirations were 18, blood pressure was 139/89 and temperature was 101.9F. There was no focal weakness or paresthesias, but the patient did report pain with slight flexion of the neck. Kernig, Brudzinski, Spurling and Lhermitte's signs were negative.

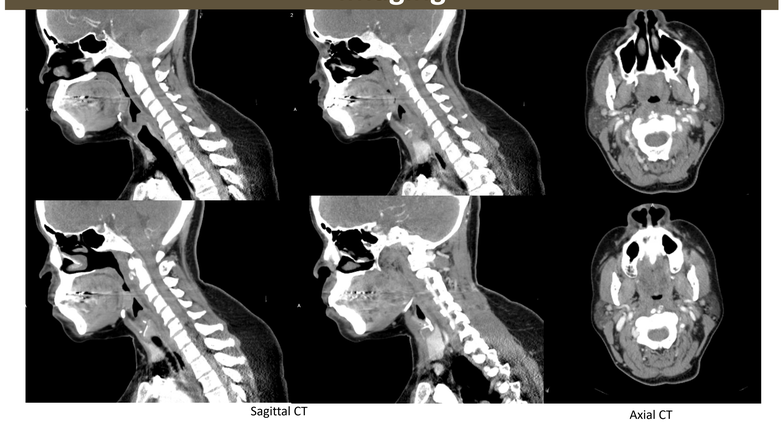
Hospital Course and Imaging

Lumbar puncture showed no leukocytosis, normal glucose and slightly elevated protein. CBC and CMP showed no electrolyte abnormalities, leukocytosis and sedimentation rate of 41mm/hr. CT of brain without contrast showed no acute intracranial pathology

Brain MRI showed mild nonspecific white matter changes and no intracranial abnormalities. MRI of the cervical spine showed no herniated discs, enhancing lesions or cord compression. C-spine MRI did show heterogenous retropharyngeal enhancement and soft tissue thickening with prevertebral fluid from C2 to C5. Spondylitic change at multiple levels with some effacement of the thecal sac were also seen on MRI

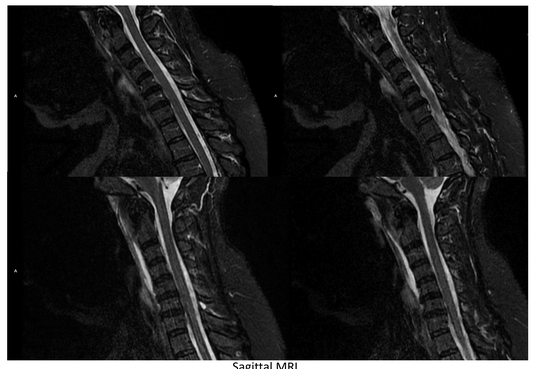
CT of the neck and bedside laryngoscopy showed no abscess formation which was originally suspected. CT did show calcification, interval decrease in the fluid/effusion in the retropharyngeal space and edema in the longus coli muscles compared to a previous MRI. These findings correlated clinically with ACTLC

Imaging



Sagittal CT

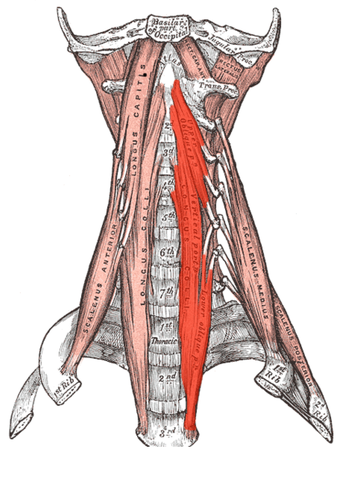
Axial CT



Sagittal MRI

Discussion

ACTLC is a rare diagnosis that often mimics more common diagnoses in signs and symptomology. This patient's presentation, along with history of viral meningitis offered insight into the often identical presentation of ACTLC to many other diagnosis, such as meningitis. In this case, thorough imaging lead to an accurate and prompt diagnosis, allowing for the appropriate course of management and avoidance of utilizing resources that are unnecessary in the setting of ACTLC



Conclusions

The in-patient diagnostic course and treatment for ACTLC is conservative in comparison to other diagnoses on the differential in these acute patients

Though a very infrequent final diagnosis, being able to identify the pathognomonic components of calcification and edema in these cases early on is prudent in terms of use of in-patient diagnostic efforts and initiating the correct treatment plan of steroids, NSAIDs and rest

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Does Retensioning of Adjustable Loop Cortical Suspension Devices Improve Performance: A Systematic Review and Meta-Analysis

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Introduction

- In the United States alone it is estimated that there are approximately 130,000 anterior cruciate ligament reconstruction surgeries annually [1]. There are many techniques used for graft fixation: cortical suspension devices, interference screws, and cross pin devices, with each having advantages and disadvantages [2, 3].
- Two main categories of cortical suspension devices are the fixed loop device (FLD) and the adjustable loop device (ALD). FLD can provide biomechanically sound fixation with minimal elongation as the graft incorporates into the bone. However, these devices also require precise calculations regarding the graft and tunnel length, and they do not permit change in length when encountering differing bone tunnel dimensions [4]. ALD allows for simpler insertion by avoiding intraoperative calculations as well as minimizing over drilling, [5] which maximizes the bone-graft interface.
- There are concerns, however, that these devices may exhibit increased displacement with cyclical loading when compared to FLD type devices in some biomechanical studies. One of the unique benefits of an ALD is the ability to re-tension after intraoperative cyclical loading, which allows the surgeon to retighten the device and remove some of the initial laxity. Few studies, including a recent meta-analysis, [6] have evaluated the effects of re-tensioning in their analysis
- The purpose of this study is to compare FLDs to ALDs with and without re-tensioning to determine whether re-tensioning the device can recapture some displacement and make it biomechanically equivalent to the FLD.

Materials & Methods

- PubMed, Embase, and Cochrane Library databases were searched for eligible studies up to July 15, 2020. Using the search terms (cortical or suspensory) and "anterior cruciate ligament" and "biomechanical." Resulting abstracts were reviewed to identify any biomechanical model studies that compared adjustable loop systems to fixed looped systems and tested for displacement and or load failure were included for analysis
- Included studies were examined to identify the primary outcomes of interest which were the total displacement (in mm) and failure load (in N) of each device.
- Data extracted for devices installed and tested in animal bones as a model for human bones and retensioning status (retensioned versus non-retensioned).
- Statistical analysis was performed using the open-source software OpenMeta (http://www.cebm.brown.edu/openmeta/) and SigmaStat (Systat Software Inc. San Jose California USA).
- The primary analysis was a sub-group meta-analysis to examine the within study differences between ALD and FLD. In this analysis the subgrouping was based on whether the ADL was retensioned or not. The standardized mean difference and 95th Confidence Intervals (CI) for each group were found using a random effects model [7]. In studies where there were multiple control devices tested, ALD were matched to FLD using a random assignment process.

Results

- In the animal bone (ABM) displacement analysis there was a significant difference between the non-retensioned ALD and the FLD (p=0.018). There was no significant difference between the retensioned ALD and the FLD (p=0.995). When comparing the non-retensioned ALD to the retensioned ALD there was no significant difference (p=0.317)

Figure 1

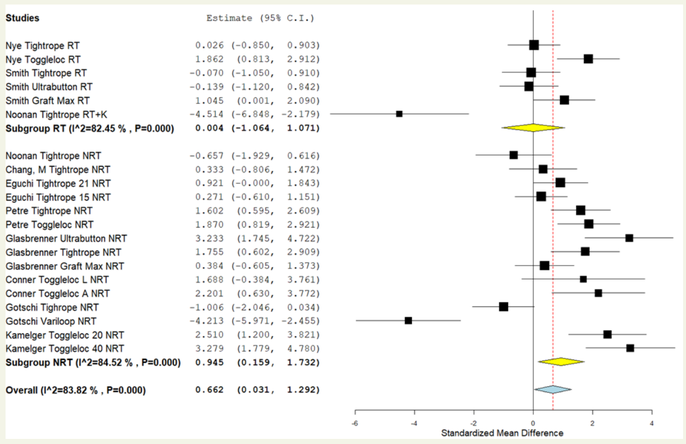

Figure 1: Forest Plot for the meta-analysis of standardized mean displacement difference from animal model studies. NRT=Not retensioned. RT=Retensioned. K=Knotted. Unloaded refers to a protocol that featured smaller lower limit forces during cyclical testing. Number "20" or "40" next to device refers to length of device loop in millimeters. "L" refers to placement on lateral cortex whereas "A" refers to placement on anterior cortex

Discussion

- The goal of this study was to compare the biomechanical performance of FLD to ALD with retensioning
- This study found that retensioning the ALD allows it to preform similar to the FLD when testing for cyclical displacement
- The outcomes of this analysis compare favorably and expand on the results of a recent meta-analysis [6]. Houck et al. performed a meta-analysis comparing adjustable loops to fixed loops and found the adjustable loop had significantly higher displacement [6].

Conclusion

- In conclusion, retensioning adjustable loop devices improves their biomechanical performance and allows ALD to perform similar to FLD in animal model studies

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Effect of Hydroxyurea (HU) on cardiac function in children with sickle cell disease (SCD) : A Review of studies

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Background

- HU decreases the severity of anemia in patients with SCD
  - It reduces the degree of hemolysis and the frequency of vaso-occlusive crisis in both children and adults.
- Chronic anemia and hemolysis have been shown to affect the cardiac function negatively;the main cause of mortality in SCD patients.
- The aim of the review is to update our knowledge on available evidence and evaluate whether the early initiation of HU in children with SCD may yield any benefit in the prevention of its cardiac complications.

Review

- We searched Pubmed publications from 2009 using the keywords “Echocardiography”, “sickle cell” and"child”.
- Of the 101 articles, 48 articles matched our question.
- We narrowed the search further by adding “Hydroxyurea” as another keyword and ended with 19 articles. Three reviews, a meta analysis, and a case report were excluded.
- One study published online in 2021 was added that partially answered our question
- 11 articles discussed the relation between cardiac parameters and HU use which were included in this review.
- 6 measured the tricuspid regurgitation velocity(TRV) as a pulmonary hypertension marker
  - Only 2 of them showed significant TRV reduction as the result of HU administration.
  - One study failed to detect the protective effect of HU on cardiac remodelling[3].
  - The remaining 3 studies either showed no statistical significance of the results or did not directly study the correlation between HU and cardiac dysfunction.
- 6 studies measured different sets of cardiac parameters such as left ventricular size, mass and function.
  - Only 3 studies measured the direct effect of HU on cardiac parameters, and compared to those not on HU.
    - Faro et al demonstrated absence of left ventricular hypertrophy only in patients who took high doses of HU.
    - Montalembert et al reported abnormal myocardial perfusion scans in >50% of SCD patients. However, 2 of 8 patients who took HU for 6 months showed improvement.
    - In Dharo et al’s report, LVEF, LV dilation and LV mass all improved with HU when compared to baseline.
  - The remaining 3 studies showed no HU effect due to the small sample size on HU

Conclusion

- Recent studies that focused on the assessment of the correlation between cardiac remodelling and HU administration have shown beneficial HU effects.
- Prospective longitudinal studies are needed to assess HU effects on the ventricular mass, function and strain and to determine if it can prevent and/or reverse the cardiac damage resulting from SCD.

Gastrointestinal involvement with vasculitis; A rare and difficult distinction between Intestinal Tuberculosis and Inflammatory Bowel Disease

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Introduction

Gastrointestinal involvement is common with various types of vasculitis. The diagnosis may be difficult to obtain as presentation can mimic Inflammatory Bowel Disease and infectious enteritis. We describe a 43 year old female with a history of international travel and therapy for Tuberculosis (TB) who presented with signs and symptoms of Inflammatory Bowel Disease (IBD). Lower endoscopy revealed circumferential ileal inflammation with biopsies ruling out Crohn's Disease and microorganisms. Serology and kidney biopsy reveal P-ANCA positive Crescentic Glomerulonephritis and, despite the risk of TB dissemination, this patient was treated with plasmapheresis, steroid taper and mycophenolate.

Case Report

Patient was a 43-year-old foreign-born, Spanish speaking female with a history of latent Tuberculosis who had recently completed a 3-month course of Isoniazid. She had discontinued the medication due to worsening myalgias, abdominal pain and nausea; all thought to be side effects of therapy. She presented to the emergency room due to worsening postprandial abdominal pain that was described as diffuse and severely tender that waxed and waned. She had received pelvic ultrasound showing only cystic changes of the ovaries without acute process. Labs were significant for worsening normochromic, normocytic anemia with hemoglobin dropping from 9.4 to 6.9 g/dL with normal Ferritin and B12 levels and low Folate level at 4.2 ng/ml. Acute kidney injury with initial creatinine level (crt) of 2.49 mg/dL which later climbed to 4.42 mg/dL. Elevated inflammatory markers with a CRP of 44.37 mg/L, ESR of 80 mm/hr, and Fecal Calprotectin level of 375 ug/mg. Cross sectional imaging without contrast due to AKI showed mild retroperitoneal lymphadenopathy, multiple calcified lymph nodes, and thickened/inflamed loop of small bowel. There were edematous/inflammatory changes in the surrounding fat. Findings were most suspicious for severe terminal ileitis.

Gastroenterology was consulted for concern for GI bleed versus IBD flare vs Intestinal Tuberculosis (ITB). Colonoscopy revealed normal rectal exam and colon. The small bowel was intubated showing a normal distal ileum **(Figure A)** however the following 5-7 cm of small bowel showed continuous severe ulcerative inflammation with erythema and spontaneous bleeding **(Figure B)**. More proximally, the ileal mucosa was again normal appearing. Biopsies revealed fragments of terminal ileal mucosa with intact to reactive appearing architecture with lamina propria showing areas of increased neutrophils that extend into surface epithelium and show features of erosion/ulceration. There were no granulomas identified and Acid Fast Bacilli (AFB) stain was negative.

Over the course of her hospitalization, she was treated with broad spectrum antibiotics. She began to develop worsening kidney insufficiency and later required hemodialysis. Multiple urinary analysis showed persistent proteinuria. Suspicion for vasculitis led to serology evaluation with positive P-ANCA. Renal ultrasound revealed bilateral echogenic renal cortices with minimal thinning which could suggest chronic renal disease and was otherwise a normal ultrasound of the kidneys.

Case Report

A subsequent CT guided core renal biopsy showed Crescentic Glomerulonephritis with segmental sclerosis and severe interstitial fibrosis and tubular atrophy. Arterial intimal fibrosis and arteriolar hyalinosis were absent. She was treated with hemodialysis, plasmapheresis and high dose steroid therapy despite the risk of disseminated TB. Patient and family eventually decided on seeking a second opinion at a tertiary center and were subsequently transferred. Tertiary center specialist's diagnosed our patient with drug-induced SLE along with the Crescentic Glomerulonephritis and began treatment with mycophenolate, prophylactic Bactrim and steroid taper.

Discussion

Vasculitis is inflammation of blood vessel walls and occurs at least some time during the course of the disease (2). From the various forms of vasculitis, mainly IgA Vasculitis (Henoch Schoenlein Purpura), Eosinophilic granulomatosis with polyangiitis (Churg-Strauss) (EGPA), and Variable Vessel Vasculitis (VVV), these diseases have shown to induce signs and symptoms with gastrointestinal involvement (1,2). Abdominal pain is the most common symptom followed by GI bleeding and systemic symptoms including dyspnea, chest pain, headache or peripheral edema. This clinical picture overlaps with patients presenting with IBD and ITB, and like vasculitis and IBD, ITB is mainly a disease of young females mainly associated with the ileocecal region of the GI tract. Several studies have investigated GI involvement with vasculitis and have identified endoscopic characteristics of patients with vasculitis in an effort to compare and contrast these diseases to IBD and infections. Certain patterns were associated with the varying vasculitis with varying descriptions of mucosal changes and distribution patterns of various vasculitis diseases throughout the GI tract (1,4).

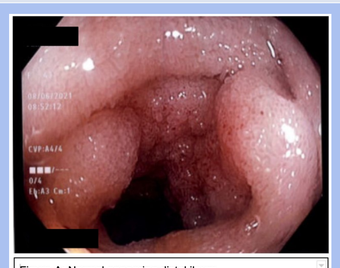

Figure A: Normal appearing distal ileum

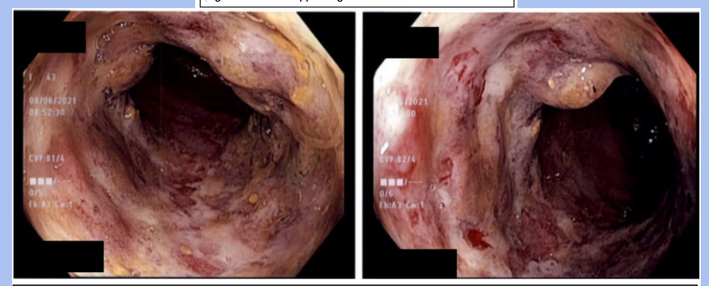

Figure B: continuous severe ulcerative inflammation with erythema and spontaneous bleeding of the ileum

Discussion

When compared to IBD, a patient with VVV may have round or oval shaped, punched-out lesions and without aphthous ulcers while a patient with Crohn's disease will typically have irregular, longitudinal ulcers with cobblestone appearance with aphthous lesions (7,9). These findings contrast with the endoscopy findings of ITB which include ulcerative, hypertrophic and ulcero-hypertrophic mucosa with transverse ulcers and deformed ileocecal valve.
Histologically, ITB pathology will see multiple large caseating granulomas per high power field with positive Acid Fast Bacilli (6,7,10). With Vasculitis, characteristic histological findings are mainly described as polymorphonuclear leukocyte infiltration or leukocytoclastic vasculitis (1,4,5). This differs from patients with Crohn's disease as they typically have non-caseating epithelioid granulomas (5,10). These various studies of GI disease with vasculitis also confirmed that biopsies are low yield compared to dermatologic biopsies as most mucosal biopsies are limited to superficial portions of mucosa and cannot reach the deeper vessels (1,4,9). There are no internationally accepted standardized treatments for GI involvement in vasculitis. Therapies reported include steroids, Sulfasalazine, 5-ASA, Anti-TNF, cyclophosphamide, and/or IVIG with treatments of plasmapheresis (1-4,9). Treatments for IBD include steroid therapy, antitumor necrosis factor (anti-TNF) therapy and potentially biologics. Patients who receive anti-TNF therapy for Crohn's disease are susceptible for TB reactivation or acquisition with potential for dissemination (7). To reduce latent TB reactivation, patients should receive Rifampin/Isoniazid for 3 months prior to commencement of anti-TNF therapy, or if they develop TB during treatment, be given standard antituberculosis therapy (6). With all three differentials of IBD, ITB, and Vasculitis, surgical management is conservative, with perforation being managed by resection and end-to-end anastomosis. Obstruction can be managed by strictureplasty or, in severe cases, by resection. Obstruction and fistulae may respond to purely medical management (6,7).

Conclusion

- It is imperative to take a very detailed history and physical exam and keep a high index of suspicion for vasculitis related GI disease.
- GI related disease with vasculitis is rare but can be life threatening if missed and the diagnosis has been historically difficult to establish per several reviews and case reports (1,3,4,9).
- This carries even higher importance in areas where TB and certain vasculitis are endemic as therapy differs substantially and may lead to disastrous outcomes if not correctly identified.
- Providing awareness of this uncommon pathology may help eliminate delay of diagnosis as rapid medical therapy appears may help prevent complications requiring surgical intervention.

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Hyperglycemia in Diabetics With COPD Exacerbation Treated With Corticosteroids

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Introduction

- A common component of treatment of COPD exacerbation is systemic corticosteroids. These improve symptoms and lung function, and decrease the length of hospital stay (1)
- Exact dosage and route of treatment varies. GOLD guidelines recently changed to recommend 40mg oral prednisone,(2) but dosages range from 30-60 mg oral prednisone or 60-125 mg methylprednisolone up to four times daily. (3)
- Oral versus IV steroids have been shown to be equally efficacious through non-inferiority studies with endpoints of treatment failure or relapse. (4)
- At Ascension Genesys there are two regimens most commonly used. Initiation of corticosteroids is usually done with solu-medrol 40mg IV every eight hours, or a lower dose regimen of 40 mg oral prednisone daily.
- Treatment with corticosteroids does have associated risks: Thinning of skin, poor wound healing, electrolyte and fluid abnormalities, osteoporosis, behavioral problems, increased infection risk, peptic ulcer disease, insomnia, hyperglycemia, hypertension, have all been linked to steroid usage (5). Exact relation of incidence of these side effects to steroids is not known but increases with dosage and length of treatment (5).
- An immediately observable and measurable side effect in hospitalized patients is hyperglycemia. This is often more profound in patients with diabetes.
- Despite multiple guidelines for COPD, there is still much variance in the treatment regimens. Some studies showing that moderate dose steroid regimens may be favorable to higher doses. (6)
- Assessing the effect steroids have on blood glucose levels may help to further determine optimal dosing and regimens for steroids in COPD exacerbation.

Hypothesis

Blood glucose measurements and therefore insulin required will be significantly higher in the IV solumedrol 40 mg every 8 hours treatment regimen compared with oral 40 mg daily dose.

Methods

Inpatients previously diagnosed with both COPD exacerbation and diabetes previously admitted to the non-ICU floor were identified through chart review. Blood glucose levels and insulin requirements within these populations were reviewed to obtain a daily average use in their respective categories.These were compared between those treated with IV solumedrol vs oral prednisone within the first three days of admission. This was to provide enough time for insulin requirements for increasing blood sugars to be adjusted by the patients' care teams. Additionally, steroid treatments are more likely to vary further into treatment time due to tapering or de-escalation of IV therapy which would cause overlap of the treatment groups. Participants should be from pre-COVID era to eliminate confounding treatments. The date range for which cases will be chosen will be 7/01/2019-12/31/2019. This data was obtained retrospectively via IT data request from Ascension Genesys Sunrise Allscripts. The two groups of steroid users were compared on total daily dose of insulin (TDD) and average daily blood glucose using means and standard deviations. A relative difference of 15% (109 vs 92) was tested for significance with the Student's t-Test for Independent group means. A total sample size of 556 (278 per group) was required to determine significance at $p<0.05$ with 90% power.

Results

- Average blood glucose level in the IV solumedrol group increased by 30.4 with a standard deviation of 94.16 while within oral prednisone group only increased by 5.8 with a standard deviation of 61.24. The difference was not significant with a P=0.45
- Insulin use increased by 19.2 units within the prednisone group with a standard deviation of 32.59 and 19.8 units in the solumedrol group with a standard deviation of 39.4. The difference was not significant with a value of P=0.96
- Both groups had large standard deviations. Given such high P-values the hypothesis of significant difference in blood glucose between the steroid regimens was not supported.

Table 1

Group	Variable Measured	N	Minimum	Maximum	Mean	Standard Deviation
Prednisone	Glucose Change D1-3	9	125	69	5.8	61.23
	Insulin Change D1-3	9	8	96	19.2	32.59
SoluMedrol	Glucose Change D1-3	53	319	174	30.4	94.16
	Insulin Change D1-3	53	52	188	19.9	39.40

Table 2

Variable Measured	Group	N	Mean	STD Deviation	P-value (within groups)	P-value (between groups)
Glucose Change D1-3	Prednisone	9	5.8	61.23	0.78	0.45
Glucose Change D1-3	SoluMedrol	53	30.4	94.16	0,02	0.45
Insulin Change D1-3	Prednisone	9	19.2	32.59	0.11	0.96
Insulin Change D1-3	SoluMedrol	53	19.8	39.40	0.001	0.96

Discussion

- The change in blood glucose in prednisone versus solumedrol groups is extremely different. The prednisone group increased just 5.8 points while the solumedrol group increased 30.4 points. That is a relative group difference of 81%.
- We did not find a significant difference between the two interventions. The reason that these increases are not statistically different from each other is likely because the individual spread and standard deviations are so large. The sample size was too small to accommodate for this.
- There were many issues in obtaining a larger sample size. Due to outsourcing of Ascension Genesys IT department, there were significant delays in data acquisition. Initial data obtained was delayed and very inaccurate resulting in manual chart review to update and improve data. This greatly limited secondary endpoints and accuracy of descriptive statistics.
- Further data aquisition was limited by COVID-19 pandemic as well.

Conclusion

Between the COPD exacerbation treatment regmens of IV solumedrol 40 mg every 8 hours and 40 mg daily oral prednisone no significant difference was observed in blood glucose or insulin used for diabetic patients. A larger patient polulation would be required to see if the treamtents differ in outcomes..

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Hypertriglyceridemia and Hypercholesterolemia In a Newly Diagnosed Type 1 Diabetes Mellitus and Response to Initial Insulin Treatment :A Case Report

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Introduction

- Hypertriglyceridemia and hypercholesterolemia are commonly seen in patients with new onset type 1 diabetes.
- This is attributed to insulin deficiency which leads to decreased activity of lipoprotein lipase.
- Insulin treatment usually corrects the triglyceride level in 2-3 days.
- However, the response of the cholesterol level is not clear.
- In this case report, we present the response of both triglyceride and cholesterol levels to two weeks of insulin treatment in a newly diagnosed pediatric patient.

Case report

- 5 year old female presented to our ER with a 2 months history of polyuria, polydipsia and weight loss.
- On presentation, she was vitally stable, alert and oriented.
- Labs glucose >600 and hyponatremia with no ketoacidosis. Triglycerides was 3199, total cholesterol 616, and low insulin levels of <0.5.
- Management:
  - Management with fluids and subcutaneous insulin for diabetes was started.
  - There was a significant decline in triglycerides levels down to 256 , however total cholesterol level remained elevated(see table to the left)
  - Two weeks later, total cholesterol levels decreased with modest improvement with the LDL cholesterol.

Day of insulin	Triglycerides	Total cholesterol	HDL	LDL*	Insulin levels
Day 1	3199	616	80	*Not done	<0.5
Day3	256	556	39	466	6.2
Day 14	279	307	51	200	N/A

Discussion

- Management with fluids and subcutaneous insulin for diabetes was started.
- There was a significant decline in triglycerides levels down to 256 , however total cholesterol level remained elevated(see table to the left)
- Two weeks later, total cholesterol levels decreased with modest improvement with the LDL cholesterol.
- Insulin has been proven to lower triglyceride levels
- Total cholesterol response to insulin is not clearly studied.
- In our case triglycerides level showed marked improvement in the first three days but total cholesterol did not improve.
- Two weeks later, triglyceride level did not change but total cholesterol showed modest improvement.

- Conclusion
- Insulin is the most powerful mediator in improving triglyceride levels with a partial improvement in cholesterol level in two weeks. In conditions where there is delayed response of the cholesterol to insulin, further investigation is warranted.

Evaluation of Violent Crime & Trauma following Stay-At-Home Mandate and Mental Health Crisis during the COVID-19 Pandemic

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INTRODUCTION

The COVID-19 pandemic caused the largest voluntary impact on the U.S. economy in history and greatly impacted the nature of policing, criminal opportunities, and criminal penalties [1]. This pandemic has far reaching, expansive, and devastating implications on individuals and society [2]. Stay-at-home orders were issued across states to prevent the spread of the virus, resulting in major disruptions of daily activities for the majority of individuals [2-5]. The burden of this disruption, along with social, psychological, and economic fallout associated with efforts to lessen the spread of COVID-19, led to intensified violence-related harm [3].

Multiple mechanisms have been theorized through which the pandemic may be associated with changes in violence and exposure to violence, such as social isolation, hopelessness, and loss [3]. Individuals with pre-existing mental health conditions, such as depression, may result in intense thoughts of suicide. Domestic interpersonal violence may increase in frequency and severity as household members are forced to spend more time together at home under high-stress conditions; having firearms readily available in this situation creates additional risks [2-6].

The unprecedented public health emergency caused by the COVID-19 pandemic and the response of mass quarantines and social distancing has created economic stress, social isolation, and decreased access to community activities leading to detrimental mental health effects. Recent publications indicate that the effect of these stressors, along with decreased access to mental health care, may lead to increased rates of suicide for populations at large, and elevated risk may be present for individuals living with a mental disorder [7-9].

OBJECTIVE

The primary aim of this study is to evaluate the social, economic, and mental health factors that may account for the increased violence and trauma case load experienced at HMC following the state of emergency and stay-at-home mandate issued by the Governor of Michigan in response to the COVID-19 pandemic.

METHODS

- Design: Retrospective chart review
- Subjects: Trauma patients admitted to Hurley Medical Center (3/2020 - 7/2021)
  - HMC is a public hospital with 443 beds. It is an ACS certified level 1 adult and level 2 pediatric trauma center
  - Selection criteria focused on intentional interpersonal and self-inflicted injuries
  - 527 patients identified
  - Reviewed for key demographic, mechanism of injury and disposition information

RESULTS

Table 1. Demographics and Clinical Characteristics. 527 patients were included. Majority of patients were male and underwent interpersonal violence.

Table 1: Demographics and Clinical Characteristics

	Total Sample
Study Sample	527
Interpersonal Violence	454 (86.1%)
Self Inflicted	73 (13.9%)
Age, mean (±sd)	26.0 (±18.2)
Mental Health Comorbidities	195 (37.0%)
Depression	37 (7.0%)
Anxiety	17 (3.2%)
Schizoaffective	10 (1.9%)
Bipolar	7 (1.3%)
ADHD	6 (1.1%)
Adjustment Disorder	6 (1.1%)
Unspecified	4 (0.8%)
Bipolar affective	2 (0.4%)
Alcoholism	1 (0.2%)
Oppositional Defiant Disorder	1 (0.2%)
Personality Disorder	1 (0.2%)
PTSD	1 (0.2%)
Two or more MHD	102 (19.4%)

Gender	
Male	397 (75.3%)
Female	130 (24.7%)

Race	
Black or African American	307 (58.3%)
Caucasian	179 (34.0%)
Hispanic	17 (3.2%)
Other	24 (4.6%)

Drug Use Hx	332 (63.0%)
THC	145 (27.5%)
ETOH	97 (18%)
Unspecified	30 (5.7%)
Cocaine	24 (4.6%)
Opiate	7 (1.3%)
Amphetamine	2 (0.4%)
Benzodiazepine	2 (0.4%)
Poly Substance Abuse	122 (23.1%)
Combined Mental Health Comorbidities and Substance Abuse Hx	138 (26.2%)

RESULTS

Table 2. Clinical Outcomes. A majority of patients had gun-shot wounds (GSW) as their mechanism of injury. Most cases were interpersonal, opposed to self-inflicted.

Table 2: Clinical Outcomes

Mechanism of Injury	
Interpersonal:	454 (86.1%)
GSW	237 (45.0%)
Battery	118 (22.4%)
Knife	51 (9.7%)
Hanging	1 (0.2%)
Other	47 (8.9%)
Self-inflicted:	73 (13.9%)
GSW	12 (2.3%)
Knife	33 (6.3%)
Hanging	8 (1.5%)
Other	20 (3.8%)

Length of Stay	
Hospital	527 (100.0%)
ICU	154 (29.2%)
Hosp. Days, mean (±sd)	6.4 (±11.2)
ICU Days, mean (±sd)	9.9 (±16.9)
Mechanical Ventilation	106 (20.1%)

Table 3. Mortality and Morbidity. A large portion of the patients underwent surgical intervention. The most common discharge disposition was home.

Table 3: Mortality and Morbidity

Mortality	46 (8.7%)
Surgical Intervention	325 (61.7%)

DC Disposition	
Home	376 (71.3%)
Death	46 (8.7%)
Rehab	28 (5.3%)
Home Care	22 (4.2%)
Psych	19 (3.6%)
AMA	11 (2.1%)
Jail	9 (1.7%)
SNF	8 (1.5%)
Transfer	4 (0.8%)
Longterm Care	4 (0.8%)

CONCLUSION

- A majority of patients had drug use history and a large portion had a mental health diagnoses.
- The most prevalent mechanism of injury was GSWs.
- Most patients required surgical intervention and a large proportion were discharged home.
- It is hypothesized the lack of access to resources for mental health and rehabilitation efforts could have led to the elevation in violent crime following the elevation of the stay-at-home orders.
- Limitations include being a single center analysis and not taking into account patients presenting to the ED without being admitted.
- Future steps include increasing the power by analyzing other centers, and comparing our results with that of other urban areas.

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Is it Mycoplasma Pneumonia induced Mucositis or Multisystem Inflammatory Syndrome in Children?

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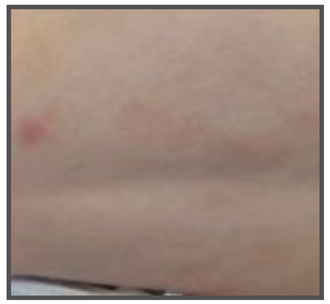
INTRODUCTION

- Mycoplasma pneumonia induced rash and mucositis (MiRM) is characterized by involvement of two or more mucosal sites and sparse skin involvement. It has been recently described as a new separate entity from other mucocutaneous eruptions.
- More recently, multi-inflammatory syndrome in Children (MIS-C) has been described in association with COVID-19. It shares some similarities with MiRM: fever, conjunctivitis, mucosal involvement, and skin eruption.
- We describe a 7-year-old female who presented with overlapping symptoms of both MIS-C and MIRM. Thus, her case represented a diagnostic challenge, particularly in an era where there is high prevalence of COVID-19 antibody positivity.

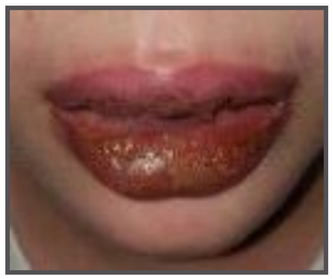
CASE DESCRIPTION

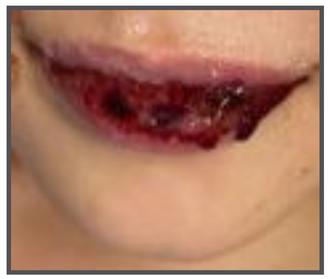
- A 7-year-old, fully immunized female , presented to our hospital following an 8-day history of fever and cough. On day 6 of her illness, she developed a patchy erythematous rash, mucositis, and fatigue. She was exposed to a case of COVID-19 8 weeks prior.
- On Exam, she was ill appearing, tachycardic, and her oral mucosa showed erosive changes. She also had conjunctival injection.
- She was noted to have leukocytosis & elevated inflammatory markers. (See table 1). Her cardiac markers were within normal limits.
- Chest radiograph and echocardiogram were normal.
- Due to her fever, rash, mucositis, elevated inflammatory markers, & SARS-COV-2 antibody positivity, she met CDC criteria for MIS-C, and was treated with Intravenous Immunoglobulin (IVIG). She was also started empirically on azithromycin because of clinical suspicion of mycoplasma infection.

Conjunctivitis



Faint, erythematous, diffuse plaques





Progression of the mouth ulcers: admission vs. discharge

White Blood Cell Count	18.9 K/UL
Erythrocyte Sedimentation Rate	30 mm/hr
Inflammatory CRP	31.41 mg/l
Mycoplasma pneumoniae IgM	1.22
SARS-COV-2 Total Antibody	Reactive
HSV PCR	Negative
Ferritin	178 ng/mL
Troponin I	<0.003
B-Type Natriuretic Peptide	4.5
Respiratory pathogen panel	Negative

Table 1 : Lab results during admission

- We believe that the presentation is more consistent MiRM, but due to the significant symptom overlap and the severe complications of not treating MIS-C, we continued to treat for both.
- The patient achieved gradual and complete recovery.

DISCUSSION

- Mycoplasma pneumonia is known for its extrapulmonary manifestations, including oral & ocular mucositis. Cutaneous involvement is usually less marked. [1]
- Due to the overlap in presentations, Reactive Infectious Mucocutaneous Eruption (RIME) is a recent, expanded term which is being used to describe mucocutaneous eruptions caused by other infectious organisms, including SARS-CoV-2, as recently reported. [2,3]
- MIS-C, a complication of COVID-19, is also known to cause a diffuse, nonspecific eruption, as well as conjunctivitis and oral mucosal changes. It is another important differential diagnosis to consider. However, typically. the mucositis is not erosive. [4]
- Since there was evidence of both COVID-19 and Mycoplasma antibodies, our patient was treated with Azithromycin, as well as aspirin and corticosteroids, as MIS-C could not be ruled out.

CONCLUSION

- When a patient presents with mucositis, conjunctivitis, rash, and fever; a wide list of differential diagnoses must be considered, including MIS-C. In the era of increasing SARS-CoV-2 antibody prevalence, due to both vaccination and previous infection, establishing and excluding a diagnosis of MIS-C is challenging.
- We believe that it is reasonable to initially attempt to rule out contemporaneous infections, such as Mycoplasma. If diagnosis is unclear, treatment for both MiRM and MIS-C can be empirically initiated in ill-appearing children to avoid both signficant morbidity and mortality

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Lymphocytic Esophagitis: Case Report and Literature Review

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Introduction

- Lymphocytic esophagitis (LyE) is an uncommon histopathologic condition first described in 2006 by Rubio et. al
- LyE is characterized by high numbers of peripapillary lymphocytes with associated spongiosis and few to no intraepithelial granulocytes
- Literature regarding LyE is confined to several small studies and case reports

Case

- A forty-four year old female presented complaining of new onset dysphagia to solid
- Esophagogastroduodenoscopy (EGD) was performed and revealed significant mucosal edema, linear furrows, and corrugations of the esophagus
- Biopsies revealed basal layer hyperplasia, elongation of the papillae, spongiosis, up to 7 eosinophils per high powered field (hpf), and 30-50 lymphocytes per hpf
- Omeprazole 20mg twice daily was started
- Repeat EGD was performed 12 weeks later and redemonstrated linear furrows, mucosal edema, loss of vascularity, and subtle corrugations of the esophagus as well as a mild Schatzki's ring
- Repeat biopsies revealed reactive epithelial changes including spongiosis, and up 3 eosinophils and 37 lymphocytes per hpf
- The patient's omeprazole was consolidated to 40mg one time daily
- On follow-up 3 months later the patient reported symptomatic improvement
- Following her EGD, she had seen an allergist and had instituted dietary measures including a vegan diet and avoidance of food-based allergens. She had also weaned herself off of omeprazole
- A follow-up EGD to evaluate for endoscopic and histologic improvement was recommended, but the patient was subsequently lost to follow-up

Endoscopic Findings

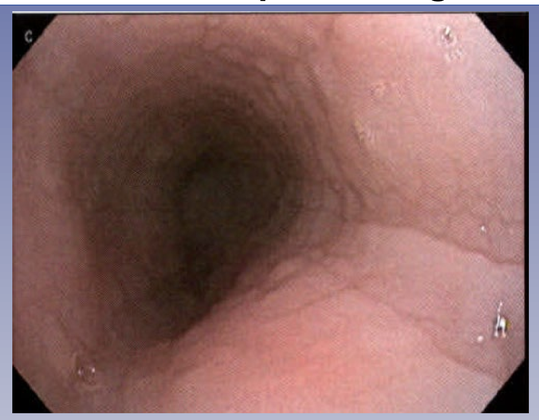

Image 1: Esophageal mucosal edema with linear furrows

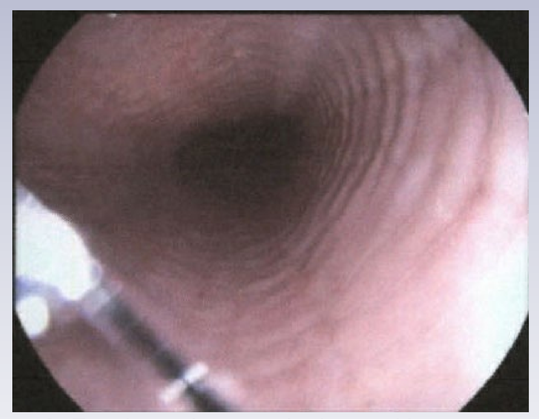

Image 2: Esophageal mucosal edema with corrugations

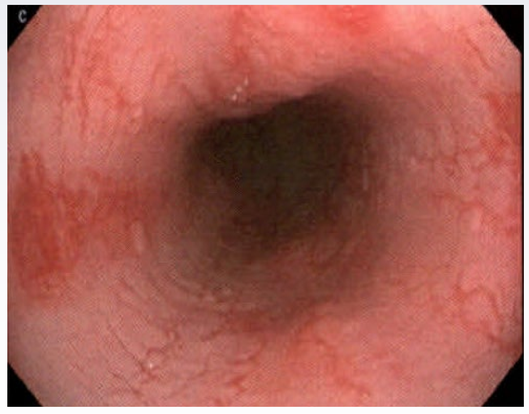

Image 3: Esophageal erythema and mucosal breaks

Discussion

- LyE is defined by its histologic findings including high numbers of peripapillary lymphocytes, associated spongiosis, and few to no granulocytes
- The diagnosis of LyE is complicated by the fact that there is no set number of lymphocytes required, and different studies have used different cutoffs, ranging from 10-50 per hpf
- LyE is thought to have a prevalence of 1:1000, but given poor recognition, the prevalence may be in excess of this estimation
- LyE most commonly presents with dysphagia, and can also present with atypical chest pain or acid reflux
- Given that literature regarding the treatment of LyE is confined to retrospective studies and case reports the optimal treatment is unknown
- LyE is most commonly treated with proton pump inhibitors (PPIs) or swallowed fluticasone in a similar fashion to eosinophilic esophagitis (EoE)
- Esophageal dilation has been used for symptomatic improvement in LyE

Conclusion

- LyE remains a poorly understood clinical entity despite it being over 15 years since its original description
- This case highlights the clinical presentation and endoscopic findings commonly found with LyE as well as symptomatic improvement following PPI therapy and dietary modification

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PEDIATRIC PUBLIC HEALTH INITIATIVE

Mindfulness in Medicine: Promoting Health, Well-being, and Resilience

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INTRODUCTION

Resident burnout is a long-standing issue in medical education with the COVID-19 pandemic causing significant additional burnout burden. Based on 3 year survey data, current burnout rates of Pediatric residents are as high as 56%[4]. Implementation of mindfulness programs have shown to improve physician wellness, decrease burnout, and create environments of resilience[1,3]. Epstein et. al. (2022) implemented a 4 day mindfulness workshop for physicians, with improvements in emotional exhaustion, depersonalization, and patient-centered care[2]. While mindfulness has recently come to the forefront for wellness, few studies describe feasible, longitudinal programs focused on resident wellness. Programs like Search Inside Yourself (SIY) teach mindfulness, emotional intelligence and leadership skills and may assist with mitigating burnout..

OBJECTIVES

To assess a feasible, longitudinal mindfulness program (SIY) for residents to combat burnout and stress; build resilience; and improve self care.

METHODS

After completion of SIY training, Dr. Sawni (pediatrician) and Dr. Wolf (psychologist), taught a modified version to Pediatric and Medicine-Pediatric residents at Hurley Hospital, Flint MI. It consisted of 12 hours, split over 3 consecutive sessions. Pre and post surveys were given, assessing demographics, wellness, and program evaluation. Desired responses to 29 wellness questions (combining Strongly Agree/Agree, Very Often/Often, Strongly Disagree/Disagree, or Rarely/Never) were compared pre to post training. The study was approved by Hurley Hospital IRB.

	Residents (n=20)
Age range	18-30
Ethnicity	40% other 20% Asian/Asian-American 20% White 15% Black/African American 5% Hispanic
Sex	70% female 30% male

Table 1. Demographics

	Pre Desired (n=20)	Post Desired (n=14)
I am satisfied with my job.	85%	100%
I more often have positive than negative emotional experiences.	80%	93%
I lead a meaningful life.	95%	100%
Most days I make time to prioritize what's most important.	70%	93%
I am able to pause before reacting.	80%	79%
I notice when my mood begins to change.	80%	93%
I use a deliberate technique to calm myself when I am in the middle of a stressful situation.	55%	71%
I am able to notice when my attention has been pulled away and return it to the present moment.	70%	77%
When I experience strong emotions, I am aware of the physical changes in my body.	85%	79%
I feel that I can bounce back quickly after an emotionally challenging situation.	55%	79%
When someone I work with is hurting in some way, I feel comfortable offering assistance or help.	80%	93%
I am able to let go of negative thoughts when I become aware of them.	55%	50%
When working with someone, I consider that individual's unique work style preferences.	85%	86%
My mind is often occupied with other thoughts while I am listening to someone.	35%	36%
I experience tension in my body due to stress.	15%	14%
I find it easy to keep my attention focused on a task from start to finish.	85%	64%
I anticipate problems and think about how to deal with them ahead of time.	75%	86%
When in conflict with someone I take time to fully understand what is driving their perspective.	80%	77%
I experience difficulty sleeping, either falling asleep or staying asleep.	50%	50%
When in a conversation, I am often thinking about what I am going to say before the other person has finished speaking.	45%	29%
I feel I actively contribute to the well-being of others.	55%	64%
I find myself habitually checking my phone or email without a clear purpose.	40%	21%
Before giving someone feedback, I try to imagine how I would feel if I were in his/her place.	75%	86%
I am able to find workable solutions to difficult problems.	80%	86%
I feel so distracted that I have difficulty sorting out what is essential from what is unnecessary.	55%	43%
I feel emotionally drained as a result of doing my work.	35%	29%
When interacting with others, I feel aware of their emotional state.	80%	79%
When faced with a difficult situation, I focus on potential opportunities.	65%	86%
I tend to find myself running on automatic, without much awareness of what I am doing.	50%	14%

Table 2. Change in key responses from pre to post training.

RESULTS

Of the 29 wellness questions,10 items had a positive change by at least 10 percentage points. There were 5 items, related to distractibility, that decreased by at least 10 points (Table 2). After the program, 93% of attendees said they were Satisfied/Very Satisfied with the program and 93% agreed that the material was relevant to current challenges. Majority (86%) reported feeling ready to apply what they learned.

CONCLUSIONS

Mindfulness as an approach to mitigate burnout and stress has been shown to be successful with residents and in limited previous studies. This program is feasible and can be introduced as part of the core residency curriculum. The increase in reported distractibility may be due to the continued pandemic and may be addressed through additional sessions, shown to help burnout and resilience. Limitations include small sample size and limited number of sessions. Future programs will include similar mindfulness interventions to support wellness longitudinally.

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Navigating Healthcare Settings: A Look At The Experiences of LGBTQ+ Patients

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BACKGROUND

It is estimated that about 3.5% of adults in the U.S. identify as Gay, Lesbian, or Bisexual (3), and about one million identify as transgender (5). Members of the LGBTQ community are more likely to face barriers to care than other groups, for example, a study conducted in 2014 found that LGBT adults were more likely to be uninsured compared to the general population (1). LGBT people are also more likely to delay care or not receive the care they need due to cost (2). Moreover, health disparities among this community go beyond just access to care. The long history of discrimination and lack of cultural competence among healthcare providers has contributed to the many healthcare disparities experienced by these communities. In a survey of over 1000 nursing, dental, and medical students, fewer than 50% reported that their school training was sufficient to prepare them to treat LGBTQ patients (4). Physicians' behaviors and biases impact care delivery; a study in 2015 found that heterosexual providers' implicit preferences always favored heterosexual people over lesbian and gay people (6). In this study, we intend to highlight perceptions and experiences of LGBTQ adults during encounters with their healthcare providers in Michigan. Specifically, we focus on how patients decide to express gender, and on the physicians' attitudes and actions towards their LGBTQ patients.

RESEARCH QUESTIONS

Guiding questions for this study are the following:
What are the healthcare experiences of LGBTQ people in Michigan?
What are the barriers to care among LGBTQ people?

METHODS

Data Collection:

- Data was collected through a novel survey administered via Qualtrics. The data was collected in two waves. Wave 1 launched on May 6th, 2020 and Wave 2 launched on May 18th, 2020, and closed on July 31st, 2020. Wave 2 was launched to diversify the sample based on race/ethnicity and age. 214 responses were included for analysis
- Each participant was compensated $15 for their time

Criteria:

- Adults age 26 and older
- Self-identified as LGBTQ
- Live in greater Lansing, Michigan

Participant Recruitment:

- We utilized community partners, including churches, academic settings, local clinics, and organizations that work with the LGBTQ community to help advertise the survey. Participants were recruited via flyers, emails, posts on social media, and word of mouth.

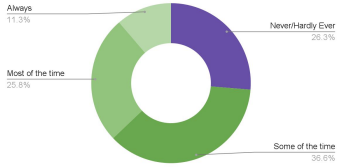
DEMOGRAPHICS

Table 1: Overview of key demographics among respondents

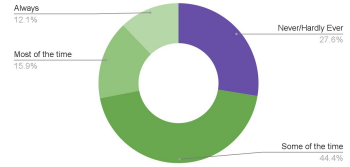
Demographic Category	n (%)
Gender	
Cisgender Women	80 (37.4)
Cisgender Men	69 (32.2)
Transgerder Women	12 (5.6)
Transgender Men	8 (3.7)
Non-binary	13 (6.1)
Genderqueer	22 (10.3)
Other	7 (3.3)
Did not answer	3 (1.4)
Sexual Orientation	
Lesbian	61 (28.5)
Gay	58 (27.1)
Bisexual	52 (24.3)
Queer	31 (14.5)
Asexual	1 (0.5)
Straight	2 (0.9)
Pansexual	6 (2.8)
Other	2 (0.9)
Did not respond	1 (0.5)
Race Ethnicity	
American Indian/Native Alaskan	4 (1.9)
Asian	4 (1.9)
Black/African American	21 (9.8)
Hispanic/Latinx	10 (4.6)
Caucausian	163 (76.2)
More than one race	11 (5.1)
Did not answer	1 (0.5)

RESULTS

How often were you worried about being negatively judged by health providers?

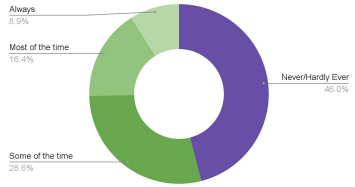


How often did health providers give you attitude or disrespected you?



Do you express your gender differently in health care settings?

How often have health providers refused to treat you?



Gender Expression

- Of those who express their gender differently in health care settings, 43% of participants reported expressing their gender as more feminine than usual, while 57% express their gender as more masculine than usual.

Most impacted gender groups:

- 91% of transgender women and 81% of genderqueer participants reported feeling worried about being negatively judged by their health providers.
- 91% of transgender women and 87% of transgender men reported having encountered health providers that gave them attitude or disrespected them.
- 79% of cisgender men and 75% of transgender men encountered a provider who refused to treat them.

DISCUSSION

Our survey reveals that LGBTQ people continue to experience challenges during health care encounters. When going to healthcare visits, over 73% of participants in our survey worried that their health care provider would negatively judge them. In addition, 51% of respondents felt the need to alter their gender expression in health care settings. Alarmingly, we found that these feelings are not unfounded, given that 72% of respondents reported experiencing disrespectful attitude from their health care providers and 54% of participants have encountered a health provider that refused to treat them.
Additionally, our study reveals differences in health care experiences across subgender groups such as transgender women, genderqueer, transgender men and cis gender men. Given the multiple health disparities among the LGBTQ community, these findings are concerning. Having to conform to societal norms, for example by presenting more masculine in healthcare settings, and having to deal with health providers biases may lead many LGBTQ people to feel unsafe and not seek care when when needed. More research is needed to examine how gender and other intra-community characterists such as race and sexual orientation affect the healthcare experiences of LGBTQ people. It is imperative that future research explores the intersectionality of the LGBTQ community.

Limitations:

- Small number of people of color
- Small number of gender diverse participants
- Survey limited to LGBTQ people located in Lansing, MI

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Neighborhood Factors and Physical Activity During the COVID-19 Pandemic for Black Pregnant Individuals

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Background

- Maternal physical activity is associated with a decreased risk of adverse birth outcomes[1-2].
- Levels of physical activity have been linked to the neighborhood residential environment[3-5].

- This pilot study explored the relationship between neighborhood factors and physical activity during the COVID-19 pandemic for Black pregnant individuals

Methods

- Black individuals enrolled in the Biosocial Impact on Black Births (BIBB) study who were still pregnant at the start of the COVID-19 pandemic were surveyed between May and June 2020.

- Thirty-three participants completed an online survey about their experiences during the early months of the pandemic.

- Participants were asked about demographics, housing type, physical activity changes since the pandemic, and perceived neighborhood environment including:
  - Disorder
  - Crime
  - Walkability
  - Racial composition

Acknowledgements

Sincere thanks to the National Institutes of Health, National Institute of Minority Health and Health Disparities for grant funding, NIH Grant #7R01MD011575, as well as FlintMed for the acceptance.

Results

- The participants were 20-39 years old with all but one in the third trimester of pregnancy. The majority identified as being low-income.

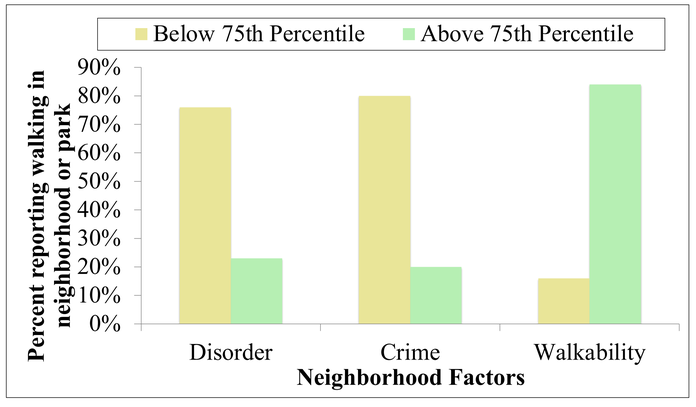
Employment Status	
Employed	10 (30.3)
Unemployed	23 (69.6)
Financial Status	
Very poor, not enough to get by	11 (33.3)
Barely enough to get by	22 (66.6)

- Sixty-one percent of participants reported decreased physical activity levels during the COVID-19 pandemic compared with pre-pandemic.

- Living in an apartment or residing in neighborhoods with lower levels of walkability or higher levels of disorder and crime were associated with lower physical activity levels.

- Compared with participants who lived in townhomes or houses, individuals who lived in apartments were less likely to exercise in their home (43% vs 20%).

- There were nonsignificant differences in neighborhood characteristics for participants who reported walking in their neighborhood or park.



Discussion

- The results suggest that housing type and neighborhood environment relate to physical activity levels among pregnant Black individuals.

- We are not aware of any published studies on physical activity during the pandemic among pregnant Black individuals. The small sample size limits statistical power to detect statistically significant results.

Conclusion

- While already a group reporting low physical activity, levels may have further decreased for Black pregnant individuals during the COVID-19 pandemic, especially those in apartments and in a worse neighborhood environment.

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Pelvic Fractures and Associated Urogenital Injuries in Children: A Systematic Review

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INTRODUCTION

It is well-established in the orthopaedic literature that adult pelvic trauma can result in urologic injury, especially posterior urethral injury.

Because of the anatomic differences between the adult and pediatric pelvis, it may be valuable for traumatologists to understand the immediate and long-term urogenital sequelae of pelvic fractures, specifically in children[1].

Figure 1: Voiding cystourethrogram – 15 year old male[2]

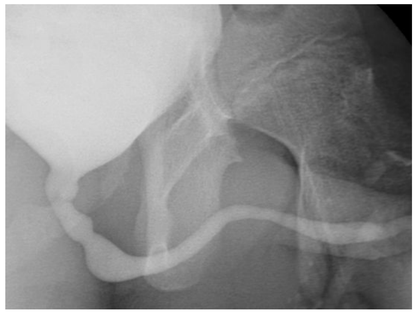

Table 1: Characteristics of patients with pelvic fractures and associated urogenital injuries

Total Patients	882
Reported Sex	
Male	380
Female	132
Not reported	370
Mechanism of Injury	
Motor vehicle collision	335
Pedestrian vs motor vehicle accident	239
Fall	22
Other (Crush injury, train-related, or farm-related)	32
Pelvic Fracture Type	
Unspecified pelvic fracture	564
Multi-site pelvic fractures	48
Disruption of pelvic circle	37
Ilium	21
Acetabulum	19
Unilateral ramus fracture	6
Bilateral ramus fracture	4
Ischium	3
Torode & Zieg classification	
Type I	1
Type II	33
Type III	48
Type IV	38
Tile classification	
Type B	24
Type C	17
Vertical compression fracture	2
Bucket handle fracture	2
Lateral compression fracture	1

METHODS

A literature review was conducted following the PRISMA systematic review guidelines. Pubmed, MEDLINE, SCOPUS, and Cochrane databases were searched on December 21st, 2021 yielding 525 papers. Included papers were required to contain stratified data on pediatric patients who suffered pelvic fracture and subsequent urogenital injury. The papers were reviewed using Rayyan QCRI with each included paper confirmed by at least 2 reviewers. Data was collected from all included studies and verified by at least 2 reviewers.

Figure 2: PRISMA diagram for review protocol

Search terms:
(child OR adolescent OR pediatric OR paediatric) AND (pelvic trauma OR acetab* injury OR pelvic injury) AND (urogenital trauma OR urethra* OR urinary tract trauma OR urologic trauma OR urologic complications)

RESULTS

The most common mechanism of injury was motor vehicle collision (335 patients), followed by motor vehicle vs. pedestrian accident (239), and fall (22).

Specific pelvic fracture type was largely unspecified. Among cases where pelvic fracture type was described, stable & unstable pelvic ring disruption fractures (123) and multi-site pelvic fractures (48) were most common.

The most common specific urogenital injuries immediately following pelvic fracture included urethral injury (746), bladder/bladder neck injury (137), and vaginal/vulvar laceration (21). A common post-traumatic complication was the formation of a urethral stricture (265), which was a frequent indication for surgical intervention when resulting in incontinence.

Among cases where the entire urologic surgical history of the patient was described, early urethral realignment and repair (378) was the most common form of post-traumatic intervention. This was followed by delayed urethroplasty (284). Repeat surgical interventions (77) were required when primary management or prior surgery failed and resulted in persistent stricture or incontinence.

CONCLUSION

Children involved in high impact blunt trauma should be assessed for pelvic fractures. Blunt pelvic trauma can cause urethral disruptions that may result in immediate incontinence or lower urinary tract injury. It is fairly common for these urethral injuries to subsequently develop into strictures that must be surgically corrected. The location of urethral injury in pediatric pelvic fracture may be more proximal than in adults, but the overall pattern of urethral injury is less predictable. Surgical intervention for urethral injuries can be effective for reducing long-term urologic morbidity. This may be attributed to the plasticity of pediatric pelvic tissue and its ability to adequately heal from traumatic injury. However, aggregate data on life-long outcomes is needed to best understand the results of these injuries and interventions.

Table 2: Associated Urogenital Injuries and Interventions

Reported Location of Urogenital Injury	
Urethra	746
Bladder OR Urethra	81
Bladder	36
Vagina/vulva	21
Bladder neck	20
Kidney	16
Urethra/vagina	3
Perineum	2
Uterus	1
Scrotum	1
Urogenital diaphragm	1
Unspecified urologic injury	9
Reported Location of Urethal Injury - Male	
Posterior	136
Proximal	22
Prostatic/bladder neck	13
Prostatic	4
Prostatomembranous urethra	65
Prostatomembranous junction	20
Proximal membranous	1
Membranous	45
Bulbomembranous junction	31
Bulbar	4
Reported Location of Urethal Injury - Female	
Urethrovesical junction	1
Proximal	9
Mid-urethral	4
Distal	2
Complete	10
Urologic Intervention	
Non-Surgical Intervention	41
Early Urethral Realignment/Repair	378
Delayed Urethroplasty	284
Suprapubic Cystostomy Alone	5
Urethrotomy	2
Unspecified	5
Other	8
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Instances of Repeat Surgery Needed	77
Urologic Outcomes Post Intervention	
Continent	305
Incontinent, Short Term/Repaired	45
Incontinent, Long Term/At Last Follow Up	41

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PSORIASIFORM ERUPTION IN PEDIATRIC PATIENT USING TNF-ALPHA INHIBITOR

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VIVIDA DERMATOLOGY

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INTRODUCTION

- Tumor necrosis factor alpha (TNF-α) inhibitors are used to treat a variety of conditions, such as rheumatoid arthritis, juvenile idiopathic arthritis, psoriatic arthritis, and inflammatory bowel disease.[1] These agents work by targeting TNF-α, a proinflammatory cytokine that affects gene expression.[2]
- TNF-α inhibitors can present with a range of cutaneous side effects, such as infections, eczema, lichenoid eruptions, lupus-like syndrome, and injection site reactions. While used in the treatment of psoriatic arthritis, TNF-α inhibitors can induce or exacerbate psoriasis.[3,4]
- To manage this paradoxical psoriatic eruption, patients should be referred to dermatology to confirm the diagnosis, with possibility of discontinuing the agent if causation is likely and the reaction is severe.[5]

EXAMPLES OF TNF-α INHIBITORS:
Remicade (infliximab)
Enbrel (etanercept)
Humira (adalimumab)
Cimzia (certolizumab pegol)
Simponi (golimumab)

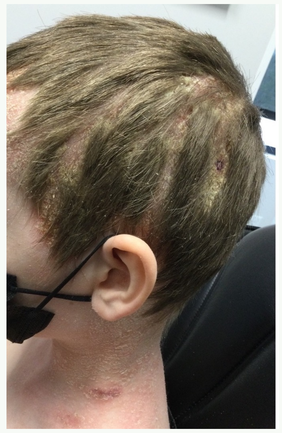

Figure 1: Physical examination of right central frontal scalp during initial encounter.

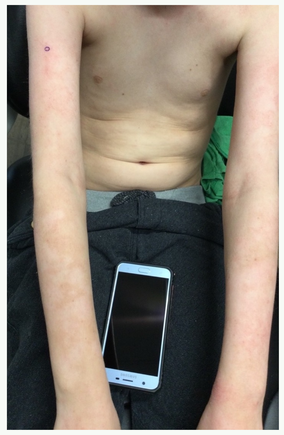

Figure 2: Physical examination of bilateral arms during initial encounter.

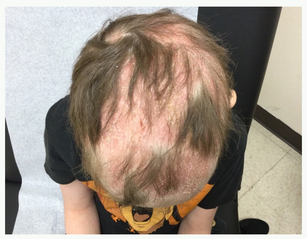

Figure 3: Physical examination of scalp during four-week follow-up. Hair loss attributed to increased inflammation.

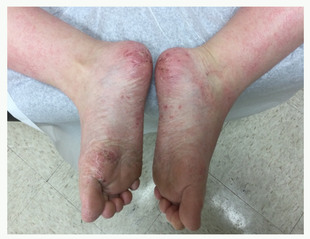

Figure 4: Physical examination of feet during four-week follow-up.

PATIENT PRESENTATION

We present a case of a 12-year-old male who was referred to dermatology with a two-month history of an active rash located throughout his body. Patient had consulted previous providers and was started on treatment with hydrocortisone 2.5% cream, fluocinonide 0.05% solution, and triamcinolone 0.1% cream with no improvement. The patient has a past medical history of asthma, contact dermatitis, and Crohn's disease. He was started on adalimumab seven months prior; however, was switched to vedolizumab by his GI specialist a few weeks before visiting dermatology due to the presentation of the rash. He received two doses of vedolizumab at time of initial encounter. Patient also has a mass in the left clavicle with history of countless biopsies done to rule out lymphoma, which all have been inconclusive. He has no known drug allergies. Family medical history is only significant for melanoma in his paternal grandfather.

CLINICAL COURSE

INITIAL ENCOUNTER

HPI/ROS:
- see patient presentation
- (+) rash, pruritus, pain, blistering sunburns
- (-) for joint aches, stiffness, swelling

Physical Exam:
- erythematous, crusted, scaly plaques on right central frontal scalp **(Figure 1)** and throughout body **(Figure 2)**
- xerosis on left inferior medial midback

Plan:
- **punch biopsy** of right central frontal scalp skin and right anterior proximal upper arm
- continue **current skin regimen***
- begin **fluocinolone acetonide 0.01% topical scalp oil** once daily
- **follow up in two weeks** for suture removal

Differential Diagnosis:
- tinea corporis
- psoriasis
- cutaneous T-cell lymphoma
- Reiter's disease

TWO-WEEK FOLLOW-UP

HPI/ROS:
- improvement of scalp scaling with fluocinolone acetonide scalp oil use
- (+) rash, pruritus, pain, blistering sunburns, difficulty sleeping due to pain
- (-) joint aches, stiffness, swelling

Physical Exam:
- unchanged from initial encounter

Pathology:
- features both psoriasiform and pustular follicular-based

Plan:
- **suture removal**
- continue **current skin regimen***
- begin **augmented betamethasone 0.05% topical ointment** twice daily for itching and irritation
- begin **diphenhydramine** nightly as needed for pruritus
- **follow-up in two weeks**
- continue **Crohn's disease treatment protocol** per GI

FOUR-WEEK FOLLOW-UP

HPI/ROS:
- recent biopsy of mass in left clavicle negative for malignancy
- (+) rash, pruritus, pain, blistering sunburns
- (+) joint aches, swelling, and stiffness
  - located in right knee and left sternoclavicular joint
  - had MRI of left clavicle done at local hospital

Physical Exam:
- psoriasiform papules coalescing into plaques distributed on the scalp **(Figure 3)** and throughout body **(Figures 4)**

Plan:
- continue **current skin regimen**
- switch to **fluocinonide 0.05% topical cream** twice a day as needed for irritation
- submit **prior auth for XTRAC** treatment
- request **recent MRI results** to determine possible psoriatic arthritis
- **follow-up in two weeks**

DIAGNOSIS

PSORIASIFORM DERMATITIS SECONDARY TO TNF-α INHIBITOR TREATMENT FOR CROHN'S DISEASE

MANAGEMENT

Along with following a skin regimen* consisting of topical medications, emollients, and wet wraps, patient has started to receive XTRAC laser sessions as needed. In comparison of his physical examinations prior to beginning XTRAC **(Figures 5 and 6)**, patient has tremendously improved after 11 XTRAC sessions **(Figures 7 and 8)**. Patient is being monitored for any evidence of psoriatic arthritis involvement and is being followed by his GI specialist for management of Crohn's disease.

BEFORE XTRAC SESSIONS

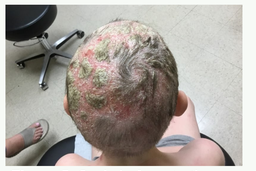

Figure 5: Scalp before starting XTRAC sessions.

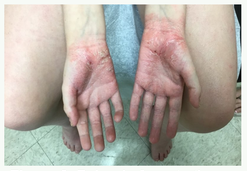

Figure 6: Palms before starting XTRAC sessions.

AFTER 11 XTRAC SESSIONS

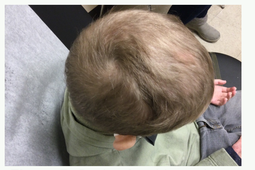

Figure 7: Scalp after 11 sessions of XTRAC.

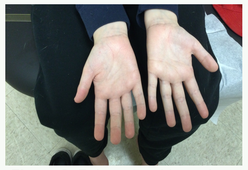

Figure 8: Palms after 11 sessions of XTRAC.

DISCUSSION

- From a systematic review of 4564 pediatric patients treated with TNF-α inhibitors, 4.6% of patients developed paradoxical psoriasis, 3.3% of which were treated with adalimumab.[6] Similar to our patient's presentation, the scalp was the most common site of involvement, occurring in 47.5% of those affected. Majority of the patients (63.3%) were continued on TNF-α inhibitor therapy. From those who switched TNF-α inhibitors, 32.0% had complete clearance. However, of those who switched to a non-TNF-α inhibitor therapy, only 81% of patients had complete clearance of paradoxical psoriasis.[6]
- The XTRAC laser is a 308 nm excimer laser which utilizes UVB technology[7] to treat a variety of skin conditions, including vitiligo, mycosis fungoides, atopic dermatitis, and alopecia.[8] In the treatment of psoriasis, XTRAC has shown efficacy in the pediatric population with minimal side effects.[7]
- This case presentation highlights how to manage paradoxical psoriasis in the 29% of pediatric patients who do not have complete clearance even after switching to non-TNF-α inhibitor.[6]

ACKNOWLEDGEMENTS

The authors would like to thank the patient and his family for allowing us to share his case presentation.

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A Quality Study on COVID-19 Vaccination Implementation, Safety and Effects Among Emergency Department Staff

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Introduction

Thirteen months elapsed between the time of pandemic expansion and the release of the COVID-19 vaccinations.. Many healthcare workers had already been infected by the COVID-19 virus at that time, which led to questions about how the vaccine may affect an individual that already had a natural immune response. ("CDC Public Health Science Agenda for COVID-19 | CDC"). COVID vaccines became available to Ascension Genesys Hospital employees on December 23, 2020.

This study was designed to gather information surrounding the side effects of the vaccines, including severity, duration, and impact to daily life. The study examines COVID-19 vaccination and correlation of severity of symptoms with previous illness.

A cross sectional survey questionnaire was created using REDCap and distributed electronically to Ascension Genesys Hospital Emergency Department staff.

Hypothesis

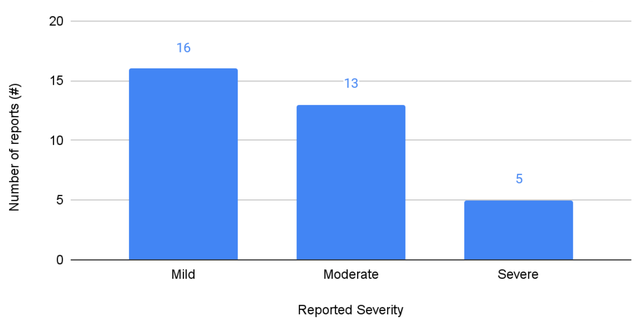
Covid vaccinated adults will have more severe vaccine-related symptoms if they had experienced a previous covid infection than those who had not.

Methods

The survey questionnaire was developed by two research professionals and three emergency physicians at Ascension Genesys Hospital between January 2021 and June 2021. Ascension employees including doctors, nurses, administrators, pharmacists, technicians and secretaries were sent an electronic REDCap survey link via email on June 9, 2021. Survey completion was voluntary. There was no financial incentive or reward given, nor was there punishment related to completion of the survey. Responses were collected between June 10, 2021 and July 21, 2021.

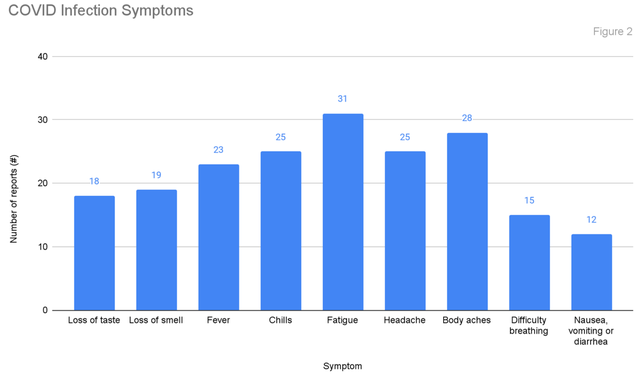
COVID Infection Severity

Figure 1



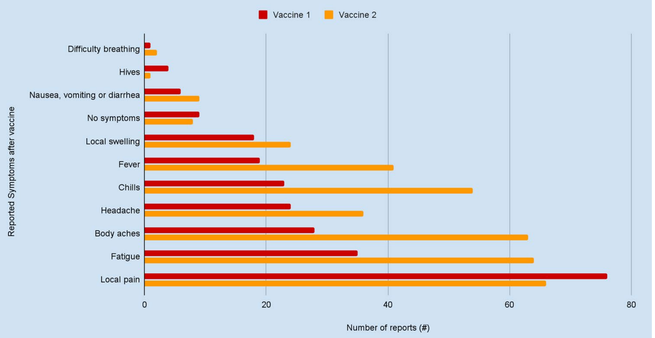
COVID Infection Symptoms

Figure 2



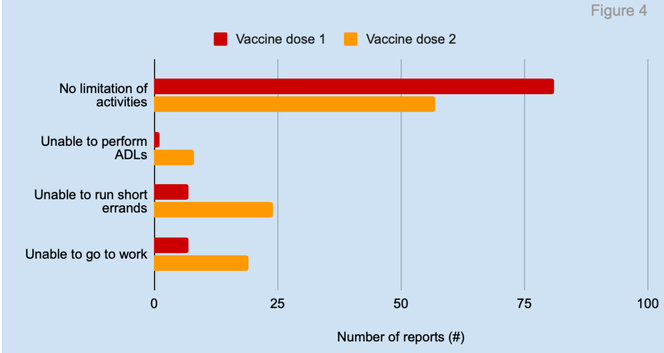
Vaccination Symptoms

Figure 3



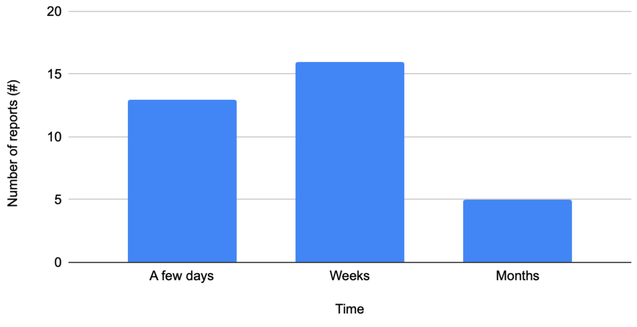
Impact of Vaccination

Figure 4



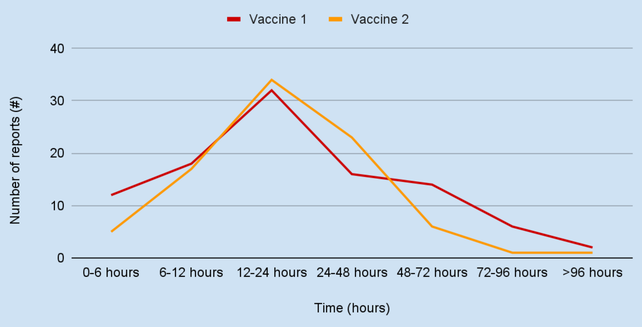
Duration of COVID-19 Symptoms

Figure 5



Duration of Symptoms following vaccination

Figure 6



Results

A total of 136 responses were obtained. 70.9% reported no COVID-19 infection, 17.2% reported COVID-19 infection, 5.2% reported clinical symptoms but negative test, and 6.7% reported clinical symptoms and no testing.

Covid-19 infection group (n= 34). Within this group, resource utilization and duration of symptoms is reflected below.

Resource utilization: 2.9% (1) hospital admission, 5.9% (2) oxygen by nasal cannula. 97.1% (33) no hospital admission 94.1% (32) no oxygen support.
Duration of symptoms: a few days 38.2% (13), weeks 47.1% (16) months 14.7%(5).

COVID infection severity, symptoms and duration are reflected in Figure 1, 2, 5 respectively.

There was *no difference* in rate of reported symptoms between those vaccinated and not vaccinated (88.9% vs 83.3%; relative difference = 6.3%, p=0.24)
There was *no difference* in the rate of long term symptoms between those vaccinated and not vaccinated (16.7% vs 10.0%; relative difference= 40.1%, p= 0.67).

Discussion

COVID infection group (n=34) of 136 total respondents (25.0%) was used for analysis of the hypothesis. In this group, there was no significant difference in rate of reported symptoms and rate of long term symptoms for the vaccinated vs unvaccinated group. The relative difference was 6.3% (p=0.24) and 40.1% (p=0.67) respectively. A larger sample of persons with previous COVID infection would have improved the strength of data for useful analysis of the research question.

However, important information was collected regarding duration, severity and impact on people who received vaccinations. Local pain (75.2%), fatigue (34.7%), body aches (27.7%), headache (23.8%) and chills (28.0%) were the most frequently reported symptoms with the first vaccination dose. Local pain (66%) fatigue (35%) and body aches (28%) were the most frequently reported symptoms with the second vaccination dose. There was a similar distribution of duration of symptoms with first and second doses as shown in figures 3,4 with slightly shorter reported duration with first vaccination (Figure 6).

Overall, there were zero reports of "swollen airway," a potentially lethal side effect. 9% of people reported no symptoms with vaccine 1 and vaccine 2 respectively. 80% of people reported no limitation of activities with the first vaccine dose compared to 57% with the second dose.

Medical attention was sought out by 5 people after their second dose who reported seeing their physician in the office. No participants required hospitalization or supplemental oxygen following the vaccination. Overall the population was healthy, with 72.0% reporting no medical comorbidites. Only 2.9% reported pre-existing respiratory disease. While this may be a limitation of the study for general populations, conversely it may be representative of hospital staff. Futhermore, this study group is reflective of AGH, with a population 66% female and 92% white. This may be reflective of the healthcare workforce, but is likely not generalizable to the rest of the population.

Conclusion

We observed no difference in the rates of reported vaccination-related symptoms between those with previous COVID-19 infection compared to those without known infection. The similarity in rates was consistent for type, severity and duration of symptoms. However, the sample size in this study was small and therefore larger studies are needed to confirm this finding.

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Rib Plating Outcomes in Trauma Patients with Multiple Rib Fractures: A Retrospective Study

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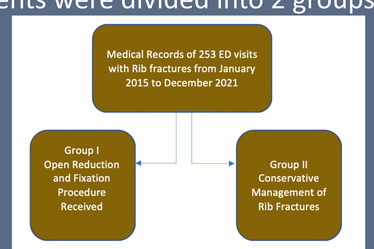
Introduction

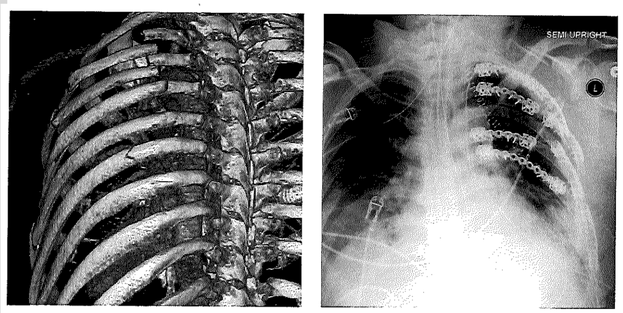
- With the elderly demographic expanding, traumatic injuries in this population have become far more prevalent
- Fractured ribs are one of the most predominant injuries in the geriatric population second to compression vertebral fractures
- Rib plating has become a popular procedure for those admitted for a blunt trauma workup in this population, due to the earlier mobility it provides post-operatively
- This study focuses on rib fractures in the geriatric population who went for open reduction and fixation during admission and analyzes the impact of this procedure on length of stay and mortality

Methodology

- A total of 253 patients from Emergency Department visits with rib fractures were analyzed from January 2015 to December 2021
- Data points and variables collected:
  - Age, sex, comorbid conditions, outpatient medications, length of stay, surgical intervention, and mortality
- Patients were divided into 2 groups



- Statistical analyses used to detect significance at ≤ 0.05 using student's t-test and chi-square test
- IRB approval was obtained for this study



PRE-OP: 3D CT reconstruction showing displaced subscapular fractures

POST-OP: Repaired subscapular fractures

Figure 1: Pre and post operative imaging of subscapular fracture via rib fixation method

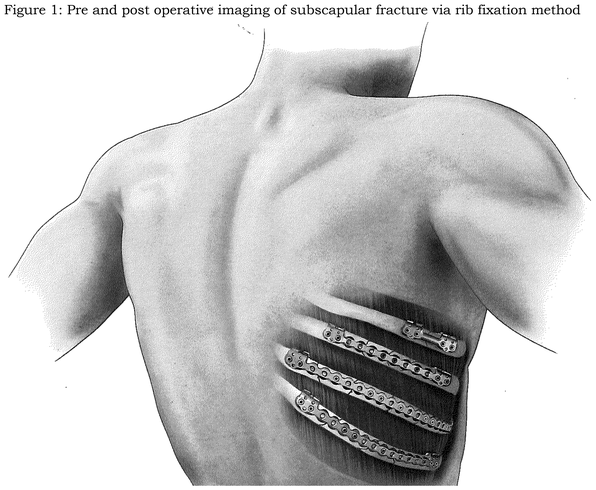


Figure 2: Illustration of plated ribs

Results

Patient demographics and data

- 63% were male and 37% were female
- Mean age of 64 ± 18.5 years
- 76% had an associated comorbid condition, defined as DM, COPD, CAD, CKD or any combination of the above
- 111, or 46% were on anticoagulant therapy
- 95% presented to the ED in the Mild GCS range (13-15) , Moderate range (9-12) was 4% and 3% of patients were categorized as Severe GCS (3-8)
- The mean ISS was 10. The overall mortality rate was 4.5%.

	Group I n=36 (15%)	Group II n=208 (85%)	p-value
CHF	23%	8%	0.007
COPD	25%	9%	0.004
CKD	11%	2%	0.01
GCS of Moderate Severity	8.3%	0.5%	0.003
ISS	14	10	0.001
Length of Stay	11	5	0.0001
Mortality	0%	5.3%	0.1

Table 1-The variable's difference between Group I (rib plating group) and Group II (conservative treatment) of patients seen with rib fractures (2015-2021)

Figure 3: Photo of titanium plates utilized in rib fixation procedures

Discussion

- Blunt chest trauma and rib fracture in the elderly patient population is associated with high morbidity and mortality
- Rib fixation is not a new concept in regard to rib fracture treatment plans. However, the application and frequency of this treatment have increased in recent years
- Indications for rib plating in the geriatric population are not clearly defined, but the benefits and improved patient outcomes are well published
- Geriatric patients with multiple comorbidities including CHF, COPD, Diabetes, CKD, and osteoporosis make this group a vulnerable population to fragility fractures
- Initial management following ICU admission includes pain control, aggressive pulmonary toilet, and monitoring for complications
- The prospect of rib plating in this vulnerable population can improve outcomes
- The majority of our patients who underwent rib plating had higher comorbidities and ISS scores, thus possibly contributing to the increased length of stay (Table 1)
- Overall, the mortality rate of group I was lower than the conservative treatment group, group II

Conclusion

Rib plating in elderly trauma patients with multiple rib fractures has shown to be beneficial in terms of mortality when compared to those treated conservatively. Furthermore, geriatric patients with comorbidities will benefit from open reduction and fixation of rib fractures, though a larger study is needed to establish clearer criteria for rib plating

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Role of Abdominal Ultrasound and Magnetic Resonance Imaging in Pregnant Women Presenting with Acute Abdominal Pain

Ascension Genesys Hospital

Authors: Tarik Wasfie, MD FACS; Alexa Marquez, DO; Holland Korbitz, DO; Eric Pearson, OMS-IV; Victor Wong, OMS-IV; Hunter Holsinger, OMS-III

Objective

To assess the value and role of MRI and Ultrasound during pregnancy in women presenting with acute abdominal pain to the Emergency Department (ED)

Background

- Abdominal pain is quite common in pregnancy and is most often benign (round ligament pain, fetal movement, Braxton-Hicks contractions)
- Surgical conditions (appendicitis, acute cholecystitis, IBD) are less common but difficult to diagnose without imaging
- Abdominal X-ray and computed axial tomography (CT) are not advisable during pregnancy because of the teratogenic effect of ionizing radiation to the fetus
- As a result, physicians are left with abdominal and pelvic ultrasound (US) and Magnetic Resonance Imaging (MRI) to assess abdominal pain in pregnancy
- The utilization of these imaging modalities is growing exponentially; therefore, researchers are yearning to evaluate the role of US and MRI and establish a protocol to manage each patient effectively and expeditiously

Educational Design/Methods

- This study is a retrospective chart review of 165 pregnant females presenting to the ED with abdominal pain from 2015-2020, 136 of which were presenting with acute pain
- Medical records were screened and data was collected on physical exam (PE), US, and MRI findings
- Additional variables collected included age, race, gestational age, comorbid conditions, laboratory tests, and hospital length of stay
- Results of the MRI findings were correlated with the physical exam and ultrasound findings and measured against the gold standard (surgery)

Data Collection/Analysis

- Statistical analysis was done using Student's t-test for continuous variables and chi square test for non-continuous variables to calculate statistical significance at $p<0.05$

Outcomes / Results

- Test statistics compared to surgery were calculated for both the US and the MRI (Figure 1).
- Ultrasound demonstrated a lack of sensitivity (0%) and moderate specificity (79%) while MRI demonstrated excellent sensitivity (100%) and moderate specificity (62%).
- The US test value was poor--Positive predictive value was 0% and the negative predictive value was 95% which was less than the 100% of the MRI.
- Likelihood ratios were calculated for each test's clinical application (Figure 2) and demonstrated that the US test result was indeterminate for ruling in and for ruling out appendicitis while the MRI allowed for high ability to rule out the disease.

Figure 1

Total Patients with Abdominal Pain (N=136)
n (%)

Exam	US	MRI	Surgery
136 patients Acute abdominal pain	**81 patients** With positive and undetermined PE	**61 patients** 25 positive & questionable US, 36 negative US	**3 patients** appendectomy
POS **NEG** 57 (42%) 55 (40%) **Undetermined** 24 (18%)	**POS** **NEG** 16 (20%) 56 (69%) **Undetermined** 9 (11%)	**POS** **NEG** 25 (41%) 36 (59%)	**NEG US** **POS MRI** 3 (100%) 3 (100%)

Figure 2

Diagnostic Statistical Results of Ultrasound and of Magnetic Resonance Imaging among the study population

	US vs Surgery	MRI vs Surgery	US vs MRI
Test Statistics (%)			
Prevalence	3.7	4.9	4.1
True Positive	0	12	50
False Positive	20.5	38	22
True Negative	95.4	100	62
False Negative	100	0	68
Diagnostic Utility (%)			
Sensitivity	0	100	32
Specificity	79.5	62.1	77.8
+ Predictive Value	0	13.6	50
- Predictive Value	95.4	100	62.2
Accuracy	76.5	63.9	59
Clinical Application (Value)			
+ Likelihood Ratio	0 (Indeterminate)	2.6 (Indeterminate)	1.5 (Indeterminate)
- Likelihood Ratio	1.2 (Indeterminate)	0 (Rule out)	0.87 (Indeterminate)
Posttest Probability	0	72%	60%

Discussion

- This study addresses the utilization of ancillary tests to support the diagnosis of a surgical abdominal condition in pregnancy
- The reliability of physical exam skills and ultrasound are user-dependent and can be very difficult in the third trimester because of the large size and habitual position of the gravid uterus and adnexa.
- Ultrasound could not effectively rule in disease (0% PPV); when combined with the likelihood of misinterpretation, its inclusion may create more questions than answers
- MRI yielded 62% specificity and was 100% sensitive in detecting pathology-confirmed acute appendicitis
- However, MRI is costly and not readily available; therefore, the value of this imaging should be discussed thoroughly between physicians and patients

Conclusions and Implications

It was clear from the findings that the US had little to no value in the diagnosis of acute abdominal pain during pregnancy. Even with expert sonography, the likelihood of misinterpretation is high and creates more questions than answers. Therefore, the question of whether pregnant women with acute abdominal pain and positive PE should get an immediate MRI without preceding US is a valid question. The data clearly showed that if there is a positive PE performed by experienced clinicians (senior resident, attending), this should qualify the patient for an MRI.

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“Thumbprint” Cast Reduction for Minimally Displaced Pediatric Supracondylar Humerus Fractures

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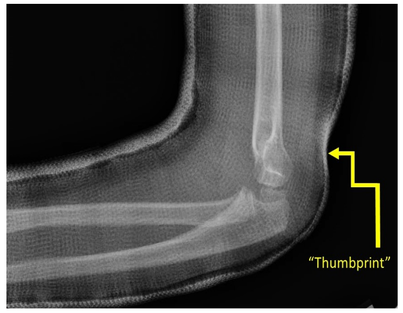
Introduction

Supracondylar humerus (SCH) fractures are a common pediatric elbow injury. While treatments for Gartland Type I and III supracondylar humerus fractures are well-established, the treatment for type II fractures remains controversial. Historical treatment involved casting in hyperflexion, which was fraught with devastating complications, such as Volkmann’s contractures. In the modern era, type II SCH fractures are typically treated with surgical intervention via closed reduction and percutaneous pinning. Recent literature suggests that minimally displaced type II fractures can be adequately treated with casting and without long term loss of function. This study evaluates the practicality of a casting technique that incorporates the placement of a “thumbprint” mold over the supracondylar region of a casted elbow maximally flexed at 90˚ (Fig. 1) as an alternative to surgical intervention.

Figure 1. Thumbprint Mold at Supracondylar Region



Methods

This is a retrospective case series. Radiographic films were used as the primary outcome measure to assess maintenance or loss of reduction during treatment. Radiographic measures included Baumann Angle – BA **(Fig. 2**), Shaft-Condylar Angle – SCA **(Fig. 3),** and Hourglass Angle – HA (**Fig. 4)**[1]. All patients with type IIa supracondylar fractures (no coronal malalignment, change of ≥ 10 degrees on lateral SCA with a norm 35 degrees) were included.

Radiographs for each patient were assessed by three reviewers at three timepoints: pre-treatment, during treatment, post-treatment following cast removal. Pairwise post-hoc comparisons were performed to assess maintenance of reduction between all timepoints. Data analysis included p-values for continuous variables and inter-rater and intra-rater reliability to determine the statistical significance for each angle. Complications of cast treatment, if present, were also assessed.

Figure 2. Baumann Angle

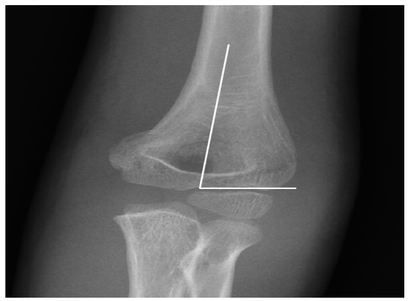


Figure 3. Shaft-Condylar Angle

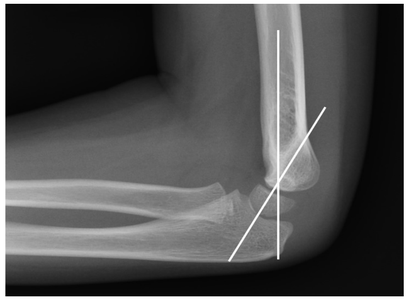


Figure 4. Hourglass Angle

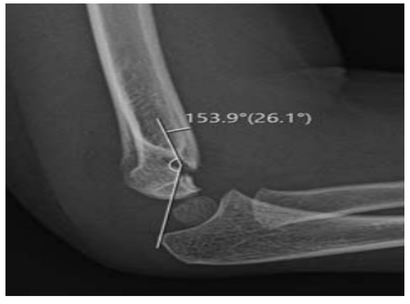


Figure 5. Pairwise-Comparison for BA

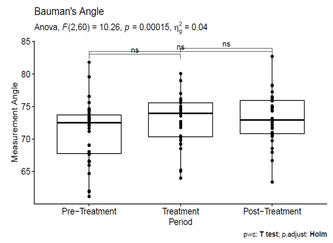


Figure 6. Pairwise-Comparison for SCA

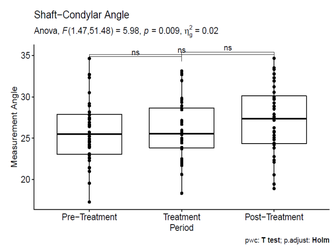


Figure 7. Pairwise-Comparison for HGA

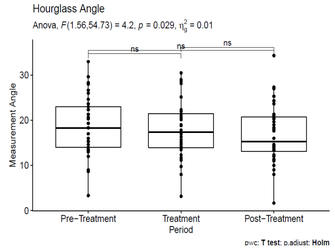


Table 1. Intraclass Correlation Coefficients for Raters

Measurement	ICC	Legend
Baumann’s Angle	0.426	Less than 0.40—*poor*
Shaft-Condylar Angle	0.087	Between 0.40 and 0.59—*fair*
Hourglass Angle	0.459	Between 0.60 and 0.74—*good*
		Between 0.75 and 1.00—*excellent*

Results

Thirty-six pediatric patients with type IIa supracondylar fractures were included in this case series with an average age of 5.6 years at time of fracture. The average time to healing with cast removal was 4.1 weeks and average length of follow-up of 1.6 months. Three patients (0.08%) experienced mild skin irritation from casting and 1 patient (0.02%) reported a foreign object lodged within the cast. No major complications were noted. No patients required surgical stabilization following treatment with a thumbprint cast. All patients went on to complete union.

Pairwise comparisons (Post-Hoc testing) were made to infer which timepoints differed significantly from one another. There is no significant difference with measured angles between all time points during the treatment **(Fig. 5, 6, & 7)**, demonstrating maintenance of acceptable alignment throughout treatment. Linear Mixed models were used to estimate variance components and derive the Inter-Rater, Simple Intra-Class Correlation (ICC) to assess the consistency, or conformity of measurements made by multiple observers measuring the same quantity. The data shows ICC measurements for BA & HGA were fair; while SCA was poor. (Table 1).

Discussion

This is the first study to evaluate the “thumbprint” cast technique for treatment of minimally displaced type IIa SCH fractures. There were few mild complications reported, but no major complications. Maintenance of an acceptable reduction was demonstrated at all timepoints throughout treatment indicating that the thumbprint mold may be an acceptable alternative treatment to surgical intervention in this population.

This study does have several limitations. It is a small, retrospective study with no control group (cast without thumbprint mold, or surgical intervention), short-term follow up and inadequate data around long-term complications. Future investigations of a large sampling of patients with longer follow up compared to patient treated surgically would yield useful data regarding the long-term safety and efficacy of the thumbprint casting technique.

Conclusion

Despite the limitations of this study, the results are promising. Data shows that this casting technique may be an acceptable alternative to surgical intervention in pediatric patients with type IIa SCH fractures. Further research is needed to validate the safety and efficacy of this technique.

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Transporting forward facing children fitted with hip spica casts: detailed crash test results, cast features, and child seat considerations

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Background

Transporting a child treated with a hip spica cast is reported by parents and caregivers to be very challenging. This is due, in part, to the difficulty in placing the child into a seat. The fixed position of the cast does not usually match the geometry of the child's original car seat. Challenges around placing a spica-casted child in a car seat are not well described in training materials for resident orthopaedic surgeons and current seat designs fail to accommodate the full range of casting positions utilized in patient care. The purpose of the current project is to begin to address these issues by making fit and safety performance data available to a broad range of end users including pediatricians, allied health professionals, and crash safety engineers. By providing these detailed data and videos the project will encourage further research and education in this area.

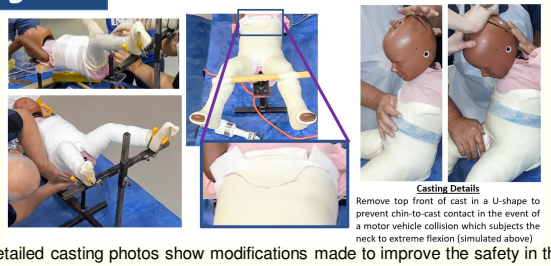
Methods

A crash dummy representing a 3 year old child was used as a surrogate for this investigation. A full hip spica cast was applied to the dummy to simulate treatment for a femur fracture. The fixed position of the casted dummy made it impossible to fit into most conventional child seats. After surveying a wide range of available child seats, it was discovered that three would accommodate the casted dummy's shape. The dummy was crash tested without a cast as a control after which a full hip spica cast was applied to the dummy. Pilot tests were conducted to identify car seats that would appropriately accommodate the fixed position of the cast. The casted dummy was then subjected to the same crash test as the control. Detailed photographs were taken of the cast as well as details associated with placing the casted dummy into the seat. High speed, high resolution video was taken of the crash to document the kinematics of the child and seat for all tests. Data from internal sensors placed throughout the dummy's body were also recorded to elucidate the loading of the body during the crash.

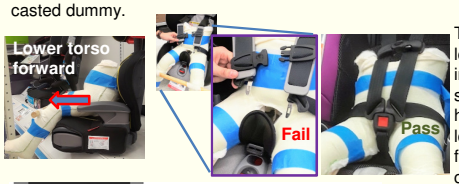
Results

Narrative descriptions of the methods and crash tests, including photographs, have been created. Videos of the crash events have been converted into lower resolution formats suitable for posting on-line. Data files documenting force and accelerations during the crash event have been clipped and reformatted into a generic format accessible to most spreadsheet programs. These data are being posted on Mendley's open access website and a Pubmed discoverable data publication is in process. This will make the data accessible for secondary uses for educational and research purposes.

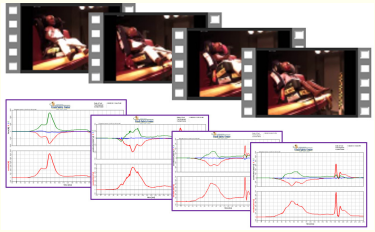
Figures



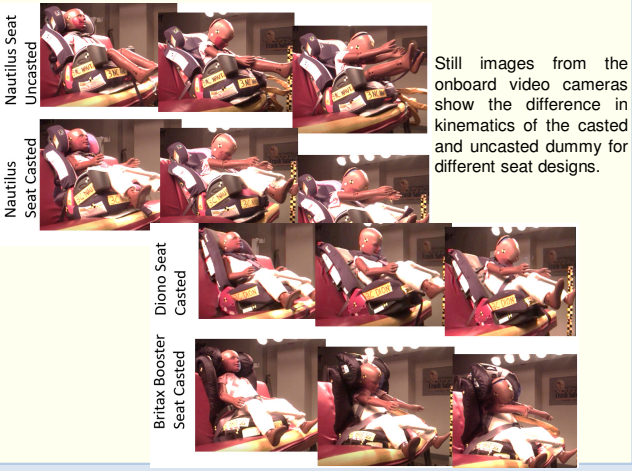
Detailed casting photos show modifications made to improve the safety in the event of a crash. Additional photos show considerations made while seating the casted dummy.



The cast moves the lower torso forward in the seat. Only four seats were found to have a sufficiently long groin strap to fasten over top of the cast.



High resolution, high speed movies allow the crash event to be studied in detail. Data from the dummy's sensors reveal the magnitude of the mechanical loading to the head, neck, chest, and pelvis



Still images from the onboard video cameras show the difference in kinematics of the casted and uncasted dummy for different seat designs.

Discussion

Crash testing is typically very expensive and it can be difficult to access data due either to proprietary reasons or practical issues with access. This project will make these data openly accessible for the first time. It is anticipated that pediatricians could use the movies in their practice to underscore the importance of the proper use of a car seat. Hospitals that apply hip spica casts could use the photos and videos as training for their surgical teams as well as the care coordinators who manage the discharge and subsequent follow-up appointment transports for the family. Finally, it is anticipated that the videos and dummy sensor data will be helpful to engineers and engineering students seeking to understand the physics of a car crash on children.

Conclusion

The hip spica cast is one example of the intersection of child passenger safety and a specialized medical treatment. Hospitals that offer hip spica casting must identify safe methods to transport patients home from the hospital and during followup visits. The current study provides detailed data that addresses some of the design related issues that are likely to be encountered by the family and the care team. This includes the design of the seat, the cast, and the interaction between them. It is hoped that other groups will also share their findings to improve this challenging issue.

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Use of Assistive Hearing Devices in Understanding Discharge Instructions in Age Related Hearing Loss

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Introduction

Older patients are often brought to the hospital on an emergent basis, and are not able to bring any assistive hearing devices. A growing body of research has shown that a patient' s age related hearing loss can have profound effects on the quality of their care, affecting such things as time to obtaining pain relief medications (1), or providers perception of patient's mental status (2). Studies have shown that patient education and close follow-up with outpatient specialists reduces rates of hospital readmissions (3). We sought to examine the utility of using a generic hearing device (a "pocket talker") in order to improve patient understanding of discharge instructions.

Methods

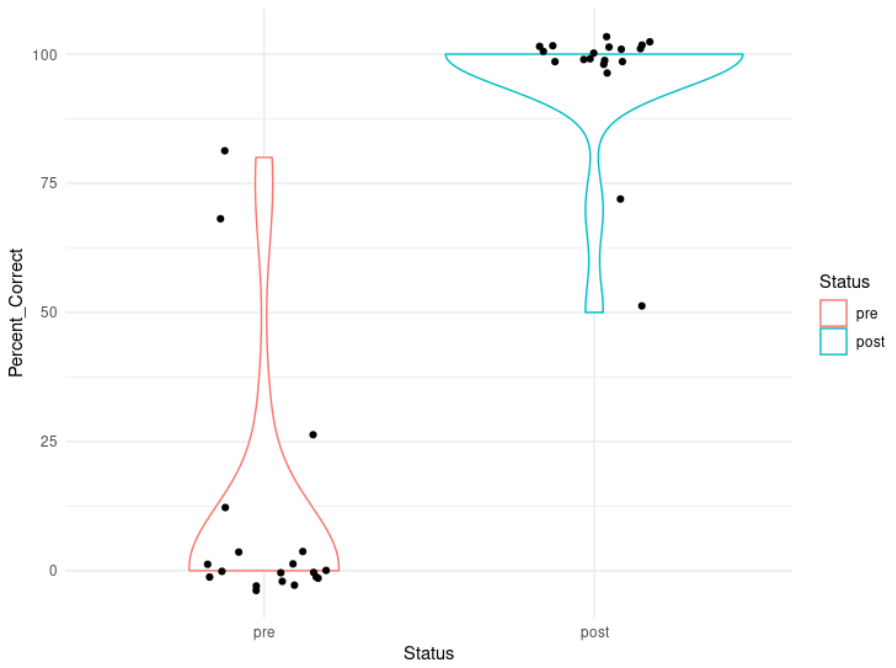
This was a pre-post interventional study. Patients 65 years and older with age related hearing loss were approached during their inpatient stays at a local hospital. Nineteen patients were interviewed. First, participants were read key aspects of the discharge instructions including medication names, dosages, and outpatient providers to follow-up with. Participants were then asked to repeat back these aspects of their discharge instructions, and a comprehension score was established out of 10 items they were able to repeat back accurately. Then, patients were provided an assistive hearing device, and the discharge instructions were repeated, and comprehension was checked again. The data was then analyzed using a

Results

Our results demonstrated a statistically significant improvement in hearing from pre intervention (mean=10) and post intervention (mean=96) ($p<0.01$) of 89%.

Paired Samples Test

		Paired Differences					t	df	p-value
		Mean diff.	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-test % correct - Post-test % correct	-85.789	25.672	5.890	-98.163	-73.416	-14.5	18	.000



Discussion

This study evaluated devices commonly known as "pocket talkers", and whether they are an effective way to enhance the patient's ability to hear important medical information. It was our hypothesis that these devices, which were chosen based on their relative ease of use and relatively low cost, will provide a simple and inexpensive way to enhance patient's ability to hear the discharge information being told to them. Our study found that providing a temporary assistive hearing device (that could be kept on the nursing unit) significantly improved comprehension of discharge instructions in older adults with age related hearing loss.

Conclusion

This pilot study demonstrates that using a temporary assistive hearing device can be used for multiple hospitalized patients. This significant change suggests the potential benefits of assistive hearing devices if patients had access to them during their stay.

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Using Lessons Learned to Establish Best Practices for Virtual Medical Education

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Introduction

- With the rise of the COVID-19 pandemic and an increasing need to slow disease transmission, many residency programs transitioned didactic learning to a virtual environment to maintain social distancing. (1-8).
- Studies have suggested the benefits of virtual learning include increased accessibility, more faculty engagement with residents, and lower costs/higher flexibility for programs to host guest speakers (3,5). However, there are also concerns that remote instruction may not be as effective as in-person learning due to technical difficulties, lack of proficiency with technology, information overload, and difficulty focusing (3,4).
- Despite the Covid-19 vaccine becoming more readily available, many authors believe it is unlikely teaching will return to pre-pandemic methods even as the pandemic subsides (3,4).
- Therefore, the purpose of this study is to analyze the strengths and improve upon the weaknesses of the current, COVID-19 adapted, virtual education practices for McLaren residents. This study will assess how effective the remote learning format has been and identify any gaps in quality, technical know-how, and equipment.

Materials & Methods

- A google survey was deployed across the McLaren and Hurley system residency programs to gather input from residents and faculty about their experiences with the virtual learning environment during the COVID-19 pandemic. The survey included basic questions such as title (faculty, resident, etc), residency year if applicable, program affiliation, sex, and age range as well as recorded which virtual events they attended this year, how many hours a week they spent in virtually meetings, and how they typically joined the meeting (iPhone, laptop, etc).
- The survey was further broken down into a section inquiring about technical issues and utilization. The questions about technical issues included how frequently they experienced a disruption, which technical issues they frequently encountered, whether they have experienced inappropriate behavior in virtual meetings, how confident they are in their ability to present and interact in virtual meetings, and how helpful they believed their residency program was in providing the necessary resources to meet virtually. The utilization portion of the survey included questions about which events they prefer to be virtual, in person, or hybrid, their level of participation in meetings, whether they prefer small or large groups, how effective they believe virtual learning is compared to in-person, and lastly, which policies they believe should be put in place for virtual meetings.

Results

- A total of 44 McLaren and Hurley residents and faculty responded to the survey from program affiliations including Orthopedics, Internal Medicine, Pediatrics, Family Medicine, and Obstetrics/Gynecology (Fig 1-2).
- Most events took place virtually aside from required testing, interviews, and clinical work which resulted in individuals spending more than 2-10 hours per week attending virtual events, typically via their laptop/tablet.
- Overall opinions regarding the current virtual environment included people having the same or lower participation in virtual meetings than in person, a preference for participation in small groups, and that virtual was just as effective as in person.
- However, most respondents experienced some sort of technical/personal disruptions such as unmuted participants and conversations between participants, presenters having technical difficulties, poor sound quality and issues with speaking up, or lack of concentration due to access location distractions (Fig 3).
- In terms of best practices, 97.7% of participants felt microphone use should be a part of policy for virtual events followed by 76.7% wanting screen sharing policies, 72.1% wanting connectivity strength policies, and 67.4% wanting meeting access location policies.

Figures

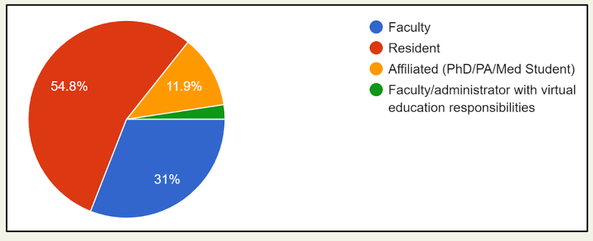

Figure 1. Position of respondents i.e faculty, residents, etc

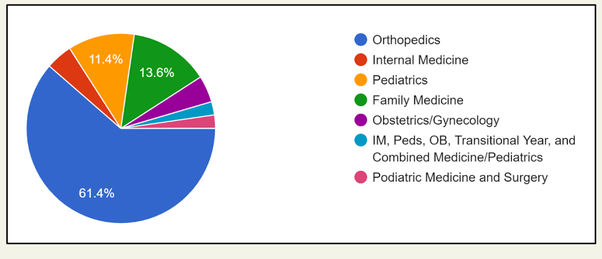

Figure 2. Program affiliation of survey respondents

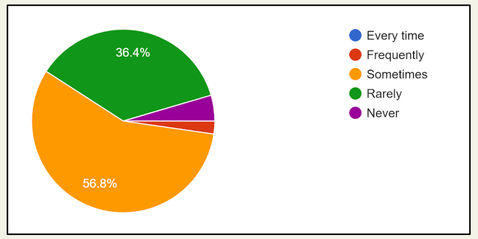

Figure 3. Frequency respondents experienced disruption in their connection during a virtual event

Discussion

- Majority of respondents felt that microphone use policies should be implemented followed by screen sharing, connectivity strength, and meeting access location policies in order to improve their experiences with virtual education.
- Moving forward, the plan is to update the Flint Orthopedics residency virtual meeting practices using these results and trial the new practices for 3 months. After the 3 months, another survey will be administered to just the Flint Orthopedic residents and faculty to assess whether the changes improved their experience and supported resident education.

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Acknowledgments: The authors gratefully acknowledge *** for their contributions toward the early development of this study.

Why Do Patients Choose Extended Care Facilities after Total Hip and Knee Arthroplasty?

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Introduction

- With the high costs of a total joint replacement (TJA), there has been an increasing push for cost containment (1,3). Studies have suggested that a significant portion of this cost is incurred from discharges to skilled nursing facilities (SNF) or other home healthcare services (4,5).
- Therefore, a payment system was implemented to reduce the cost of these procedures by changing to a bundled payment plan, under which surgeons may encourage patients to utilize a home health aide rather than be discharged to a SNF.
- Current research shows that patients discharged to an SNF tend to have poorer outcomes including higher readmission and complication rates than those who recover at home (2). However, patients rarely choose to recover in SNF for medical reasons alone and may be influenced by other factors such as age, gender, race, past medical history, and Medicare status (2).
- Many studies have looked at these non-modifiable reasons for discharge destination but none consider the modifiable reasons such as lack of a home caretaker, home layout barriers or even patient fears.
- Therefore, the purpose of this study is to look at the modifiable, non-medical factors in order to provide insight into how to better counsel patients to eliminate unnecessary discharges to a SNF and ultimately, result in lower overall cost.

Materials & Methods

- At the pre-surgery appointment, patients were directed to fill out a Risk Assessment and Prediction Tool (RAPT) questionnaire, which is widely used to predict the discharge destination of patients undergoing elective TJA, along with a joint function questionnaire (HOOS/KOOS) and healthy quality of life questionnaire (PROMIS).
- Patients also recorded their pre-operative discharge plan, and answered questions aimed at differentiating the medical vs non-medical discharges to a SNF. These questions included how far they can walk, the number of stairs in their home, and whether they will live with someone or if someone will be available to help them when needed.
- At their two week follow up, the patient completes a follow-up survey including the patient's basic demographics (age, gender, race, height, weight, past medical history), whether they recovered in the nursing home, and the reasons they chose to recover at a nursing home if applicable.
- This survey allows patients to indicate why they recovered at a SNF including: pre-operative plan to recover at SNF, medical reasons (ex.- pain, pre-existing medical issues, hospital complications), social reasons (ex.- no one available to help at home or with transportation), fears (ex.- concern for safety due to living alone or fall risks), and accessibility (ex.- getting to the bathroom, bed, kitchen or up stairs).

Results

- Of the 320 patients included in the study, 303 discharged home and 17 patients discharged to an SNF post operative: 9 for social reasons, 5 for medical reasons, 3 for accessibility reasons, 1 due to fears surrounding home discharge, and 1 planned to recover at SNF prior to surgery. Some patients listed more than one reason for discharge to SNF.
- Demographic trends demonstrate that of the patients discharged to a SNF 94% were female and 6% male compared to patients that did not go to a SNF 68% were female and 32% male.
- When comparing home accessibility in terms of stairs in the home, of patients discharged to SNF, 41.18% had no stairs in their home and 58.82% had 2-5 stairs within their home. Of those discharged to home, 17.5% had no stairs in their home, 60.07% had 2-5 stairs within their home, and 10.23% had 5-10 steps in their home.
- Of the patients discharged to SNF, 41% had a caretaker that lived with them versus 59% that did not. In comparison, 82.5% of patients discharged to home had a caretaker that lived with them versus 17.5% that did not.
- Lastly, a RAPT score of 7 or lower was indicative of a patient going to a nursing home (Figure 1).

Figure 1

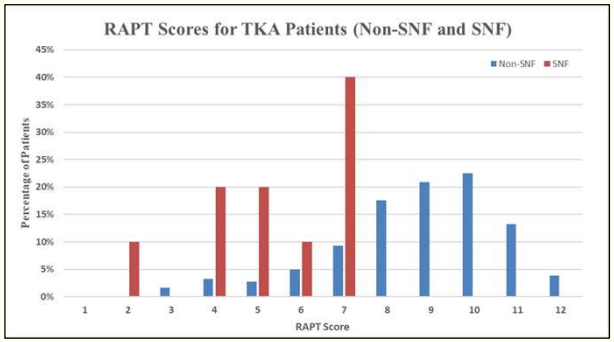

Figure 1. RAPT scores for non-SNF and SNF patients that underwent TKA surgery.

Discussion

- Only 5.3% of the study population was discharged to a SNF post operatively. The majority of these discharges occurred for non-medical reasons. Only 30% of patients reported medical concerns as the reason for discharge to SNF.
- Patients were more likely to be discharged to a SNF if they were female and did not have a caregiver to live with them post operatively. The presence and amount of stairs in the house was not a deterrent for the majority of patients in discharging home.
- Secondary to hospital COVID-19 policies, there was an approximately 3 month period in which all TJA were performed on a required outpatient basis with same day discharge to home. Thus there is a selection bias during this time frame for patients who did not need a SNF discharge.

Conclusion

- Overall this observational study demonstrates the role of non medical, modifiable factors such as presence of live in caregiver in the decision to discharge to SNF versus home.

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A Wristband QI Project to Reduce ED Visits After Total Joint Arthroplasty

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Introduction

- Patients who have undergone elective hip or knee arthroplasty occasionally return to the emergency department (ED) for care following discharge, resulting in high healthcare costs.
- A previous study showed that this can be avoided with appropriate avenues for patient communication, such as by telephone, to help reduce medically unnecessary visits to the ED (2). Additionally, wristbands have been utilized in many different settings to remind surgical teams and patients of important factors like allergies or exercise (1,3).
- Therefore, the overall purpose of this quality improvement (QI) study is to examine whether providing hip and knee arthroplasty patients with a wristband to remind patients to call their physician if they have questions or concerns post-surgery can reduce ED visits during the 90 days after their surgery.
- Within this QI broader study, a sub-study examined how responding to patient phone calls impacted resident workload, documented common patient concerns, and collected information on perceived challenges and benefits associated with this wristband project.

Materials & Methods

- Post-surgery, patients were given a wristband with a phone number that connected them to the on-call orthopedic resident, to remind patients to call prior to considering going to the ED by addressing patient concerns and give advice for appropriate follow-up care
- Residents were surveyed twice, once at 3 months and again after 6 months, to assess the calls they were receiving. This survey asked residents to indicated whether they received more calls from total hip arthroplasty (THA) or total knee arthroplasty (TKA) patients, at what point in their recovery did they call, specific issues addressed on the call (pain, wound/dressing questions, medication/patient instructions, GI issues, etc), how many calls they received, percent of calls that required action (referrals to OrthoMichigan or ED), and how long calls lasted.
- The survey also inquired about the burden the calls placed on the residents and whether or not they believed the wristband initiative improved patient care.
- Impacts on rates of ED use were monitored using data from the Michigan Arthroplasty Registry Collaborative Quality Improvement (MARQI) system which provided a count of ED visits for McLaren Flint primary, unilateral hip and knee patients.

Results

- Results from the two surveys revealed that the on-call resident received on average about 2 to 3 calls per week and spent about 10 to 15 minutes on each call, typically within the first week of the patient's surgery. They received an equal number calls from THA and TKA patients with the most common issue being pain.
- Despite a majority of the residents feeling that the wristband project placed some burden on them, all of them felt that the wristband initiative helped to improve patient care.
- Furthermore, an analysis of the MARQI data for McLaren Flint from November 2018 to May 2021 revealed that the rate of readmission post THA or TKA surgery decreased, a possible indication that the wristband helped in reducing the amount of ED visits during the 90 day period after surgery (Figure 1).

Figure 1

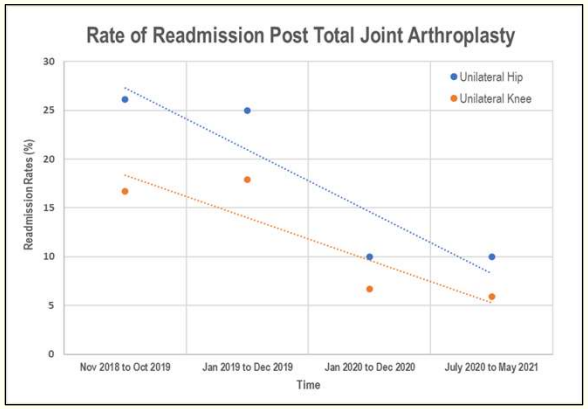

Figure 1. The percentage of readmission post total joint arthroplasty (THA and TKA) to the hospital from November 2018 to May 2021.

Readmit rate = total ED admissions/total cases in each time period

Discussion

- The wristband initiative helped to improve patient care by providing an accessible, direct contact to a physician for an immediate response to questions and concerns.
- This appears to be helping patients to avoid unnecessary ED visits and readmission to the hospital, however the current data is limited as information through the end of 2021 is not yet available.
- Additionally, Covid-19 resulted in changes to surgical practice during the project and potentially impacted patient attitudes toward ED visits, which likely impacted the results.

Conclusion

- Anecdotally, patients made positive comments about the program to attending surgeons supporting the value of this initiative.
- Overall the orthopedic residents and attending physicians involved in the study support continuation of this QI initiative.

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The Effect of transition times from IV to oral diuretics at the time of discharge on the readmission rates secondary to congestive heart failure for patients treated and admitted at a medium sized community hospital in Michigan.

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Introduction

- In 2012 over 5.7 million Americans had a diagnosis of Heart Failure (HF).
- Projected to increase to > 8 million by 2030.[1]
- HF cost was >$20 billion in 2012 and by 2030 cost is predicted to increase to > $50 billion.[2]
- 80% of those costs are related to hospitalization.[2]
- From 2009-2012 readmission rate of HF was >20%.[3]
- Research is ongoing regarding the factors that can predict increased risk of HF readmission.
- Heart failure is caused by a dysfunction in the heart structure and function.
- Disorders causing dysfunction; CAD, Diabetes mellitus, and Atrial fibrillation
- Resulting in increased Left Ventricular (LV) filling pressures → shortness of breath with exertion or at rest, lower extremity swelling, and orthopnea.[3]
- Intravenous Diuretics main symptomatic management.
- Lack of research regarding readmission rates and the optimal inpatient observation time period after transitioning from IV to oral diuretics for continuation of symptom control prior to discharge has not been established.

Hypothesis

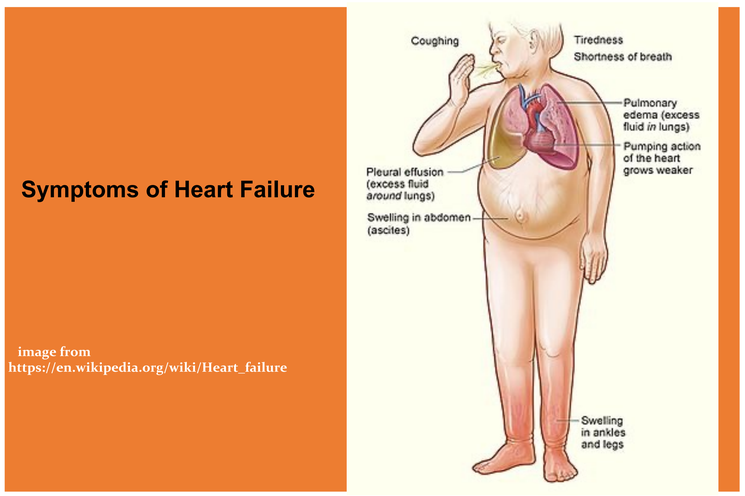
- In patients hospitalized for symptomatic HF requiring diuretics, lower readmission rates will be seen in patients observed as inpatients for >/= 24 hours once transitioned from IV to oral diuretics.
- Patients discharged prior to this 24 hours observation period will have higher readmission rates.

Methods

- Retrospective chart review of patients with a history of CHF admitted from January 2018 to October 2020 in a medium sized community hospital that were admitted for heart failure exacerbation requiring intravenous diuretic administration for symptom improvement.
- Patients were at least 18 years old, of any gender and all ethnic backgrounds with a previous diagnosis of heart failure.
- Those patients excluded included patients with a history of renal transplantation, a single functioning kidney, or diagnosis of ESRD prior to admission. Patients who who died during initial hospitalization were also excluded.
- Outcomes of readmission within 30 days and within 90 days or not at all were studied in relation to the 24 hour period of time patient was or was not observed as an inpatient off IV and onto oral diuretic treatment
- Data collected included co-morbid diseases, the initial (and readmission if applicable) hospitalization length of stay co-morbid diseases, Creatinine, BUN, GFR and pro-BNP. Length time patient was observed on oral (PO) diuretics prior to discharge was also collected.
- Analysis was performed by comparing rate of remission between the two groups using Chi square analysis and the magnitude of difference calculated with the odds ratio.
- A total of 500 (250 per group) will be required to test a 22% relative reduction in readmission rates from a baseline of 30% readmission rates and will achieve a 90% or greater power at p=0.05 significance.

Results

Results are pending.



Discussion

- Findings:
- Limitations: Collection of data required extensive assistance of information systems which proved extremely difficult. Patient criteria was not fulfilled via information systems on numerous occasions and information was initially incorrect which resulted in an inability to obtain enough patient information to fulfill a total of 500 patient requirement for statistical significance.
- Information is not generalizable as the patient data was collected from one medium sized community hospital in Michigan
- Parameters should have been evaluated to assess for optimization of heart failure symptoms.

Conclusion

- Additional research is needed to establish if patient's who are symptomatically optimized on IV diuretics and transitioned to orals should be required to be observed in hospital for >24 hours and the association with readmission rates.
- Larger sample size should be analyzed to achieve a 90% or greater power.
- Diuretic dosage and optimal symptom control parameters should be analyzed in the future.

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Resident Education to Improve Rate of Tobacco Use Assessment and Cessation in a Resident Clinic

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Introduction

- Tobacco smoking is the leading preventable cause of mortality, responsible for over seven million deaths worldwide and over 480,000 deaths in the United States annually[2] Tobacco use screening and providing brief intervention has been shown to be one of the most valuable preventative services in healthcare therefore physicians play a key role in smoking cessation[1]. The USPSTF recommends that clinicians ask all adults about tobacco use, advise them to stop using tobacco, and provide behavioral interventions and US Food and Drug Administration (FDA)-approved pharmacotherapy for cessation to nonpregnant adults who use tobacco (USPSTF). There is clear evidence that brief (<5 minutes) clinician advice to quit at each encounter can increase smoking abstinence rates. CQS requires a tobacco assessment within the recommended period, every 2 years, and a cessation management if a current user.
- Despite recommendations and benefits to screening, compliance rates remain low at Ascension Genesys Downtown Flint Health Clinic with compliance rate of 57% at the beginning of this study.
- Resident education and awareness of the frequency of tobacco screenings are some of the reported reasons for poor compliance. Other reason included the use of proper documentation to account for CQS measures.
- This quality improvement project aimed at improving resident lead tobacco screening compliance. The goal of this project was to educate, remind, and encourage physicians to screen each patient for tobacco use and provide counseling if appropriate.

Hypothesis

- One of the reasons for low compliance rate of tobacco screening is lack of provider and resident knowledge regarding appropriate documentation of tobacco assessment screening in electronic health record tracking, as well as proper documentation of tobacco cessation management plan in a way that is accounted for in CQS.
- I expect after resident education and placing reminders on each desk, the number of patients with no current tobacco assessment will improve. In addition number of tobacco users and not counseled will also decrease after tobacco cessation counseling.

Methods

- There are 34 residents and 5 internal medicine attendings who practice in the Internal Medicine Clinic at Ascension Genesys Downtown Flint Health Center. All were targeted for intervention.
- The intervention consisted of a power point presentation on the positive outcome of smoking cessation and counseling during morning report, reminder on the huddle board in clinic, and written reminders on each resident's desk. Education was also provided regarding concepts in measure in a way that would account for in documentation.
- Data was collected from a quality dashboard, CQS, which is internal to the ambulatory electronic health records.
- Data was collected both pre- and post-intervention and compared.
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Results

- Prior to intervention, 1,021 patients 12 years and older, showed 32% are non-tobacco users; 9% are tobacco users have been counseled on cessation; 16% are users and not counseled and 43% of patients don't have a current tobacco assessment.
- During the project, It was discovered that the CQS data tool was not fully working, as such, no changes were shown at 6 weeks post-intervention. Qualitative exploration with providers indicated that they had increased assessment and counseling of tobacco use. Many providers reported behavior change due to the intervention. It is assumed, although it cannot be confirmed, that the intervention was at least partially successful in improving provider assessment, counseling, and documentation of tobacco use.

Conclusion

- Brief education and daily reminders during morning huddles, as well as signage near physician work stations result in improvement of physician assessment, counseling, and documentation of tobacco use.
- Limitations to this study are the small sample size, possible decay of intervention as time moves on, and data sourcing problems with CQS.
- Future research could consider alternative data collection system, larger sample size, and extended data collection time frame.

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