

# NATIONAL ABSTRACT COMPETITION EARLY CAREER PHYSICIANS



CLINICAL VIGNETTE POSTER PRESENTATIONS



SANTA CASA  
de São Paulo

## Angioimmunoblastic T-cell Lymphoma: Case Report of a Diagnostic Challenge Presented as a Lymphoproliferative Syndrome.

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**INTRODUCTION:** Angioimmunoblastic T-cell Lymphoma (AITL) is a rare malignancy that represents 2% of all non-Hodgkin lymphomas, however, this is the most common subtype of all the peripheral T-cell Lymphomas (15-20%). The median patients' age is around 60-years-old. The most prominent symptoms are generalized lymphadenopathy, hepatosplenomegaly, fever and weight loss. The clinical presentation may mimic inflammatory, autoimmune and infectious diseases, or even other lymphoid neoplasms. Most of the patients usually have the simultaneous extranodal disease in spleen, liver, skin, lungs and bone marrow. The definite diagnosis is usually tricky, and can only be achieved by lymph node biopsy.

**CASE PRESENTATION:** Brazilian female patient, 51-year-old, born in the State of Bahia, rural worker, married, Catholic, was living in São Paulo for 2 months. She was admitted to the Emergency Department at Santa Casa of São Paulo in October/2014 complaining of abdominal pain, nausea, vomiting, lymphadenomegaly, fever, night sweats and weight loss (10kg) that had begun about 3 months ago. She smoked 1 pack of cigarettes per day for 36 years. She denied any past medical history or agrototoxic exposure. The first laboratory results showed anemia, eosinophilia, and thrombocytopenia in CBC, and a positive IgM EBV serology. Abdominal ultrasound and CT scan of the chest showed generalized lymphadenomegaly. Myelogram ruled out Leishmaniasis. The bone marrow biopsy was only hypercellular, showing hyperplasia of the three myeloid types.

Lastly, the cervical lymph node biopsy was done with immunophenotyping: CD45 diffusely positive; CD3 positive in the small and medium cells; CD20 positive in immunoblasts; CD4 positive in most of the lymphocytes – T-cell lymphoma with angioimmunoblastic features.

**DISCUSSION:** The case reported above was remarkable because it did not have bone marrow involvement, what initially drove us away from the correct diagnosis. The AITL is known to frequently involve bone marrow, however, the histologic and immunophenotypic features at this site are poorly defined. Therefore, we conclude that the lymph node biopsy is indispensable for confirming cases like this.



CT scan of the chest: mediastinal lymphonomegaly.

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# Case of a messy rash.

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# Disclosures

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- No financial disclosures.

# Introduction

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- The coexistence of systemic lupus erythematosus and porphyria although rare has been known for a long time.
- Systemic Lupus erythematosus (SLE) and porphyria cutanea tarda (PCT) may have similar clinical presentations, and their coexistence presents special problems in diagnosis and management.
- Physician should be careful in prescribing standard doses of certain medications like hydroxychloroquine for lupus as it may precipitate hepatotoxicity in patients with porphyria and therapeutic phlebotomy in patients with porphyria can worsen anemia in patients with lupus.

# Case Presentation

A 57 year old Caucasian man with history of porphyria cutanea tarda- recently started on phlebotomy treatments, COPD, alcohol abuse, essential hypertension was admitted to the hospital with recurrent syncopal spells of one day duration. He also endorsed bilateral hand pain and weakness, weight loss, shortness of breath and headache.

- Vitals on arrival: within normal limits
- Physical exam: Notable for diffuse actinic damage on skin, bilateral wrist swelling. Both lower extremities with purpuric rash. Cheeks, nose and chin with erythematous plaques with slight scale, relative sparing of forehead. Photoexposed lateral neck and chest with erythematous pink scaly plaques with slight hyperpigmented border, back with erythematous annular to polycyclic plaques with slight scale and hyperpigmented border, hands with sclerodermoid hypopigmented plaques with loss of skin markings, left knee with erythematous scaly plaques

Initial labs	Value	Imaging	
Hemoglobin	12 g/dL	CT brain	Global atrophy
WBC	2.31 X 10(9)/L		
Platelets	54000 X 10(9)/L	X-ray right elbow	Mild degenerative changes. No effusion or fractures
AST	87 Units/L		
ALT	31 Units/L		
Alkaline phosphatase	175 Units/L	Chest X-ray	Hyperinflation, no pneumonia
Total bilirubin	0.5 mg/dL		
CRP	1.2 mg/dL		



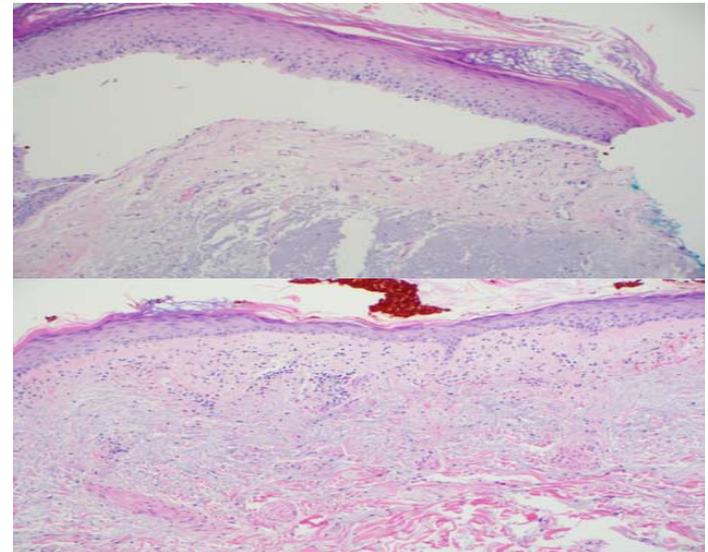
Figure 1: Patient skin findings

# Clinical Course

- Syncope was felt to be related to therapeutic phlebotomy, orthostatic hypotension. Given fluids. Phlebotomy discontinued.
- Patient started on desonide cream to face and triamcinolone to rest of the body per Dermatology
- Skin biopsy revealed evidence of porphyria cutanea tarda as well as subacute cutaneous lupus erythematosus
- Patient started on hydroxychloroquine 300 mg daily in divided doses
- Autoimmune panel was positive for ANA with titer > 1:2560 (speckled), SSA antibody > 8, SSB antibody > 8, DSDNA antibody and myositis panel negative, C3 complement: 64 and C4 complement:14.

**Figure 2:** Skin biopsy from the neck shows a cell poor subepidermal blister, consistent with Porphyria cutanea tarda.

Biopsy from right upper arm and shows vacuolar interface dermatitis with increased interstitial mucin, consistent with subacute cutaneous lupus erythematosus.



## Clinical Course-continued

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- Patient had several features suggestive of systemic lupus erythematosus. Started on prednisone per Rheumatology with recommendations for taper and outpatient follow up.
- Transthoracic echocardiogram showed reduced LV systolic function with Ejection Fraction 36% with global hypokinesis. Cardiology recommended cardiac MRI to evaluate for infiltrative cardiomyopathy which revealed abnormal patchy midwall late gadolinium hyper enhancement in the basal inferior lateral wall suggestive of non ischemic cardiomyopathy, no evidence of iron overload. This finding was more suggestive of alcoholic cardiomyopathy.
- Patient advised on alcohol cessation, limited sun exposure and importance of wearing sunscreen.

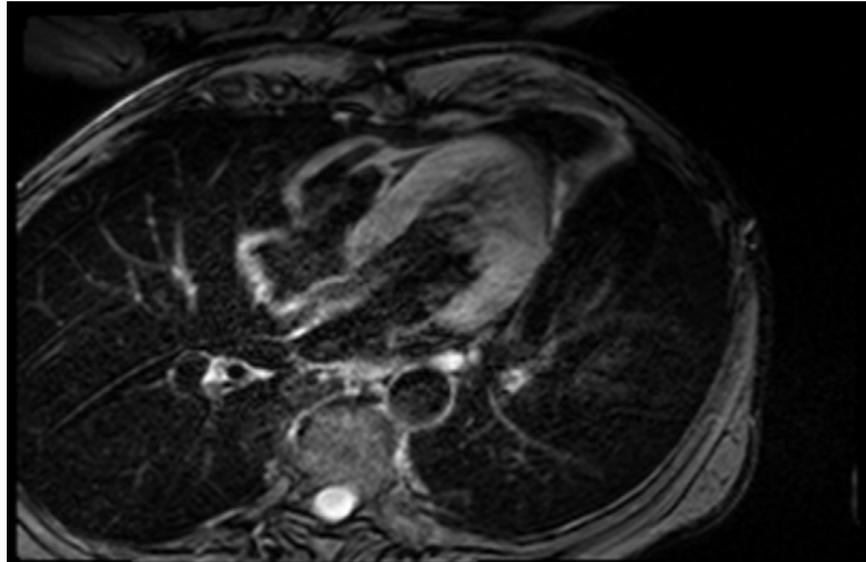


Figure 3: Cardiac MRI

# Discussion

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- The association between SLE and other bullous skin diseases like pemphigus is recognized. <sup>(1)</sup>
- Wolfram and cols first described the case of patient with SLE that later developed acute intermittent porphyria in 1952. Since then it was recognized not only the association of systemic lupus with different types of porphyria but also of discoid lupus and subacute lupus. <sup>(2)</sup>
- A study from the Mayo clinic comprising 676 cases of porphyria followed for a period of 20 years showed that SLE was present in 2.2% of them. The reasons of the association between porphyria and lupus are unknown. <sup>(3)</sup>
- Harris and cols proposed that porphyria can trigger an immune response favoring SLE. <sup>(4)</sup> The accumulation of porphyrins causes activation of the complement system and increases neutrophil chemotaxis when there is exposure to ultraviolet rays. Besides that, porphyrins are toxins that causing tissue damage release auto antigens that will serve as a source for antibody formation. <sup>(5)</sup>
- Both SLE and porphyrias have a predisposing genetic component situated in the same chromosome. The gene for the decarboxylase of the uroporphyrinogen, the enzyme deficient in cases of PCT, is located in chromosome 1(1p34) and the region 1q41-1q42 has been associated with SLE. <sup>(6)</sup>

# Conclusion

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- Although uncommon, the association between porphyria and lupus deserves attention mainly because of therapeutic challenges.
- Anti-malaria medication largely used for SLE, if prescribed in its full dose can lead to a massive porphyrinuria with fever, nausea and increase of the hepatic enzymes and some cases of hepatic necrosis. <sup>(7)</sup>
- Since anemia may be present in some patients with SLE, phlebotomy may be unwise; moreover, phlebotomy can be an exacerbating factor for some patients with combined disorders.

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# Medication-Associated Lymphocytic Colitis



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# Disclosures

None.



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# Learning Objectives

- Recognize the presenting symptoms of microscopic colitis.
- Recognize the two subtypes of microscopic colitis: lymphocytic and collagenous colitis.
- Identify common over-the-counter and prescription medications that are associated with microscopic colitis.



## The Patient: History

- A 71-year-old man presented with three weeks of watery, non-bloody diarrhea. He was having at least four episodes daily, always after eating or drinking, without any abdominal pain or cramping. The diarrhea stopped with fasting.
- The patient denied sick contacts, change in diet, recent travel, or antibiotic use.
- PMH was remarkable for a diagnosis of GERD that had previously been treated with a proton pump inhibitor (PPI). His PCP had recently switched him to ranitidine. He had no history of kidney disease.
- His most recent colonoscopy and EGD, both within the past three years, were normal.



# The Patient: Presenting Data

## Vitals

Temp: 37.2°C

HR: 85 bpm

RR: 16 bpm

BP: 127/69

SaO<sub>2</sub>: 96% on RA

## Physical Exam

General: pleasant, well-appearing

HEENT: clear sclera & oropharynx

CV: rrr, no edema

Pulm: CTAB, breathing normally

Abd: soft, nontender, nondistended

~~13.3  
6.7 284~~

141 | 110 | 30  
3.1 | 22 | 2.2

112

Mag 1.4

Stool Studies WNL

*C Diff* negative



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## The Patient: Hospital Course

- The patient was started on loperamide, but after two days his symptoms were not improved.
- GI was consulted and a colonoscopy was done; biopsies revealed colonic mucosa with focal cryptitis and lymphocytic infiltration of the lamina propria.
- Subsequently, the patient's ranitidine was stopped, budesonide was started, and his symptoms resolved over the following few days.
- He was discharged home on his original acid suppression medication, a PPI, and did not have recurrence of diarrhea.



# Discussion

- Microscopic colitis is a chronic inflammatory disease of the colon.
- The vast majority of patients diagnosed with microscopic colitis are in their fifth decade of life or older; the average age at diagnosis is 65. Only 25% of patients are diagnosed before age 45.
- Compared to the inflammatory bowel diseases (ulcerative colitis and Crohn's), microscopic colitis is thought to be far less common.

<b>Disease Incidence in North America, per 100,000 person-years</b>	
Ulcerative Colitis	2.2 – 19.2
Crohn's Disease	3.1 – 20.2
Microscopic Colitis	1.1 – 5.5



# Discussion

- There are two histological subtypes of microscopic colitis: lymphocytic and collagenous colitis. The clinical presentations, however, are essentially identical.
- Biopsy of colonic mucosa in collagenous colitis is characterized by a thick band of subepithelial collagen, whereas lymphocytic colitis is characterized by lymphocytic infiltration of the lamina propria.

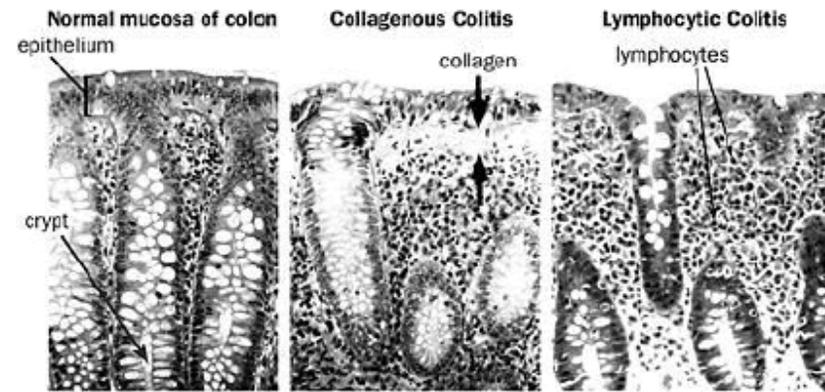


Figure 1: A comparison of histologic features of Collagenous Colitis vs. Lymphocytic colitis.

Photo from Ashraf MU, Aslam M, Zaheer MS, Rabbani MU, Khan SA, et al. (2014) Microscopic Colitis: An Overview. *Microinflammation* 1:108. doi: 10.4172/2381-8727.1000108



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# Discussion

- Many common over-the-counter and prescription medications are associated with microscopic colitis, although the pathogenesis of the condition is unclear. Smoking is also known to be associated.

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## Common Medications with a High Likelihood of causing Microscopic Colitis

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Aspirin

NSAIDs

PPIs (Omeprazole, Esomeprazole, Lansoprazole)

Ranitidine

Sertraline

Ticlodipine

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## Common Medications with a Lower Likelihood of causing Microscopic Colitis

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ACE-Inhibitors

Celecoxib

ARBs

Duloxetine

Anti-Parkinsonian Drugs

Paroxetine

Beta-blockers

Statins (Fluvastatin,  
Simvastatin)

Bisphosphonates

Topiramate

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## Discussion

- Initial treatment for microscopic colitis is discontinuation of the suspected associated medication and initiation of loperamide.
- If loperamide fails, budesonide is second-line.
- Microscopic colitis usually resolves with, and sometimes without treatment, though relapse is seen in at least 25% of patients.



# Zebras Are Not Extinct: Hemochromatosis As A Differential Diagnosis For Common Disease Exacerbations

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# Zebras Are Not Extinct: Hemochromatosis As A Differential Diagnosis For Common Disease Exacerbations

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## Introduction

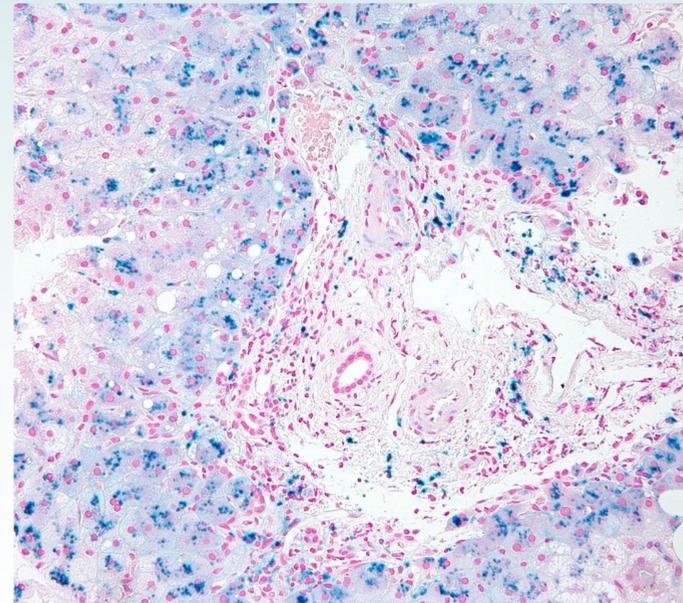
- Hemochromatosis is a disease that affects multiple organs and can be the cause of recurrent hospitalizations. It is however uncommon and thus often overlooked.

## Case Presentation

- A 43-year-old man presented to the emergency department with worsening dyspnea on exertion, chest pain and lower extremity edema.
- Recent admission for diabetic ketoacidosis (DKA) with a diagnosis of new onset diabetes.
- Previous medical history was significant for hypertension, hyperlipidemia, chronic thrombocytopenia, 30 pack year smoking history and occasional alcohol use.
- On exam, his blood pressure was 97/64, he was tachycardic with heart rate of 100/min, respiratory rate was 20/min and oxygen saturation was 95% on room air.
- He had bilateral lower extremity edema and a tanned skin which he attributed to sun exposure.
- Laboratory workup was pertinent for platelet count of 88 K/uL and elevated blood sugar at 434 mg/dL. Liver function tests were unremarkable. His chest x-ray showed vascular congestion.
- He was admitted for cardiac workup and congestive heart failure (CHF) treatment.

## Case Presentation Cont'd

- He underwent a Lexiscan myocardial perfusion imaging that suggested low probability of high grade coronary artery disease but showed severe global hypokinesis with an ejection fraction of 34%, compared to 60% on a previous echocardiogram done three months prior.
- A lower extremity venous duplex showed bilateral peroneal deep venous thrombosis.
- Chest CT angiography showed a right lower lobe pulmonary embolism and an abnormal liver with cirrhotic changes and ascites in the upper abdomen.
- A paracentesis was done and the ascitic fluid was negative for infection or malignancy with a Serum-Ascites Albumin Gradient (SAAG) of 3.5 g/dl.



Liver biopsy with hemosiderin deposits within hepatocytes. (Prussian blue)

Copyright © 2011 Michael Bonert (<https://commons.wikimedia.org/wiki/User:Nephron>)

## Case Presentation Cont'd

- Further blood work was negative for hepatitis, HIV, auto-immune causes and Alpha-1 Antitrypsin deficiency. He had an elevated ferritin at 2231 ng/mL and a transferrin saturation of 84%.
- A Hereditary Hemochromatosis DNA mutation analysis showed that the patient was homozygous for the C282Y mutation.
- A liver biopsy was performed and showed advanced cirrhosis with large amounts of hemosiderin within hepatocytes and bile ducts secondary to hereditary hemochromatosis.

## Discussion

- This case highlights the importance of keeping a broad differential diagnosis when approaching multiorgan involvement.
- DKA and CHF exacerbations are common primary causes for hospital readmissions. However, they are rarely seen as secondary entities of a multiorgan disease that warrants a completely different management and therapeutic approach.
- In this case, missing hemochromatosis diagnosis could have resulted in multiple hospitalizations and increasing costs without addressing the primary issue thus impacting mortality and morbidity.

## References

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## **Beyond conventional hyperthyroidism:**

**A rare association of inflammatory bowel disease  
and inflammatory myopathy with Graves' disease.**

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## Introduction:

- Graves' disease (GD) being one of the common cause of hyperthyroidism and thyrotoxicosis at hospital presentations. It is an autoimmune disorder, in which circulating immunoglobulin G autoantibodies bind to and activate G-protein-coupled thyrotropin receptors, causing increased hormone production and hyper functioning of the gland.
- Symptoms and signs of Graves' disease result either from the effect of hyperthyroidism or autoimmune processes. The latter include orbitopathy, goiter and thyroid dermopathy. Musculoskeletal complaints are common in patients with thyroid dysfunction. Patients suffering from Graves' disease usually experience weakness in their proximal muscle. Muscle weakness may rarely be fatal due to thyrotoxic periodic paralysis.
- Being an autoimmune disease, it may be associated with other autoimmune diseases, inflammatory myopathy like polymyositis and myasthenia gravis.
- Ulcerative colitis (UC) and Crohn's disease (CD) are the two most common forms of inflammatory bowel disease (IBD). Both are chronic recurrent conditions and are characterized by intestinal inflammation that appears to result from a combination of environmental and immune factors.
- The development of extra-intestinal manifestations during the course of IBD is well known. Although chronic thyroiditis (Hashimoto's disease) is known to be an extra-intestinal manifestation of UC, cases of concomitant CD and GD are particularly rare.
- Till date there has been few literatures showed association of inflammatory myopathy and inflammatory bowel disease in a single patient of Grave's disease. In this case report we will describe a 51 years female patient with Grave's disease associated with polymyositis and Crohn's disease.

## CASE DESCRIPTION :

- A 51 years menopausal female of Eastern part of India.
- Belongs to poor socioeconomic class.
- Having Education level up to III standard.
- Not a Known Hypertensive and Diabetic.
- Not addicted to tobacco, alcohol or any other substance.



Presented to IPGMER, Kolkata With.....

### **One months history of...**

- Palpitation, which is troublesome during activity and some time at even rest too.
- Effort dyspnoea. There was presence of Orthopnoea and Paroxysmal nocturnal dyspnoea as well.
- Peri orbital and Lower limb swelling.

### **Fifteen days history of .....**

- Jaundice.

### **Six months history of.....**

- Swelling of her neck , which was gradually increasing with difficulty in deglutition.
- More than 15 kg of weight loss.
- Episodic diarrhoea with occasional blood mixed stool.

Disease process started three and a half years back, when she has been diagnosed as Hypothyroidism depending Upon the complaints and TSH and FT4 value and put on Levothyroxine supplementation. She was never relived with this. She had history of episodic bloody stool for quiet some time but it had aggravated since last six months. Apart from mild weakness in both lower limb , mostly during squatting there were no such significant history concerning muscle weakness. No such family history was present.

- **Clinical examination:**

She was perfectly alert, conscious and had moderate pallor, icterus, oedema, periorbital swelling, elevated JVP, raised temperature, with pulse rate of 140/min irregularly irregular, Blood pressure of 150/90 mm of Hg and respiratory rate of 32/min.

- Abdominal examination revealed, ascites, 3 cm Hepatomegaly with hurried bowel sound.
- Cardiovascular examination revealed, hyperdynamic circulatory failure with atrial fibrillation.
- Neurological examination revealed, normal tone, power of 4+/5 in all four limbs in both proximal and distal groups of muscles, exaggerate DTR, planter bilaterally flexor. Cranial nerves examination was with in normal limit and there were no sign of meningeal irritation.
- Respiratory system examination showed, bilateral mild pleural effusion.



She had a neck swelling with bruit consistent with thyromegaly.

## ■ Routine Laboratory investigations:

- Hb-9.6 mg/dl, TLC- 7800/dl, N 56, L 35, M 08, E 01, **Microcytic hypochromic RBC.**
- Bilirubin- 11.2 mg/dl, Direct - 7.6 mg/dl, Indirect- 3.6 mg/dl, SGOT- 316, SGPT-395, Alkaline Phosphatase- 402.6, Total protein- 6.24 g/dl, Albumin- 3.6g/dl, INR- 1.4.
- Urea- 45 mg/dl, Creatinine- 1.45 mg/dl, Na<sup>+</sup> - 135 meq/lit, K<sup>+</sup> - 4.0 meq/lit, Corrected calcium – 8.2 mg/dl, Phosphate- 4.5 mg/dl.
- TSH – 0.005 (0.27- 4.2 mIU/L), Free T4 – 7.77 ( 0.93 - 1.7 ng/dl ), Anti TPO – >600 IU/ml (>60 IU/ml positive) , Anti TG – Positive, TSH Receptor antibody - 199.6 ( >14 U/L positive).
- CT scan of neck : **Grossly enlarged thyroid, more in right lobe with heterogenous density and retrosternal extension with tracheal compression. Few areas of rim like calcification.**
- 99mTC thyroid scan: **Both lobe enlarged with overall increased but non-homogenous tracer uptake. Focal areas of cold nodule seen in right lobe laterally and in midline.** Scan consistent with Toxic goitre, and multiple non-functioning cold nodules.

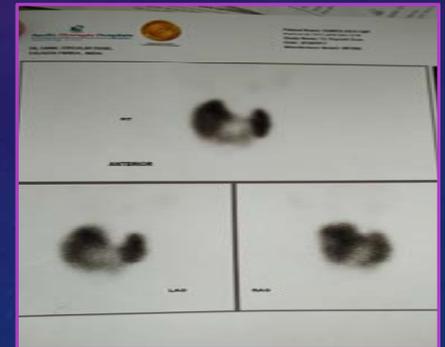


Fig 1: 99mTC scan of thyroid

Graves Disease  
Contributing to

- Thyrotoxic crisis
- Congestive cardiac failure
- Atrial fibrillation
- Hepatitis with Jaundice

We could not explain  
Bloody Diarrhoea and Dis-  
proportionate anaemia at  
that time.

## Management:

Upon diagnosis of thyrotoxic crisis with heart failure patient was managed with Carbimazole, Propranolol, diuretics and other supportive care.

## OUT OF THE BLUES.....

- Patient was gradually tiding over the thyrotoxic crisis, but on the day 4<sup>th</sup> of admission, patient had developed severe proximal muscle weakness.
- Neurological examination on day 4 of Hospital admission revealed, normal higher function and cranial nerves, normal tone, with power of 2/5 and 3/5 on both lower limbs and upper limbs respectively with preservation of DTR, planter bilaterally flexor, normal sensory and autonomic functions.
- Issues that we were unable to explain at that time was
  - Why there is Proximal muscle weakness in both upper and lower limbs?
  - Why there is bloody diarrhoea and disproportionate anaemia?
- Farther work up was planned. Serum K<sup>+</sup> - 4.5 meq/lit, Na<sup>+</sup> - 133 meq/lit, Corrected calcium- 8.2 mg/dl and Phosphate - 4.2 mg/dl.
- Patient was followed up with serial monitoring of clinical improvement and laboratory parameters.
- Proximal weakness and bloody diarrhoea was persisting even after twelve weeks of first admission, when thyrotoxic crisis was over and patient had become euthyroid. Patient was admitted for second time.
- Hence EMG and Colonoscopy was planned on second admission.

- EMG : Low amplitude, short duration, polyphasic potential suggestive of myopathy.
- Myopathy profile: ANA – negative, Anti Jo1 – Negative, C3 and C4 – Normal.
- CRP and CPK was elevated.
- Muscle MRI : Inflammation on bilateral quadriceps.
- Muscle Biopsy : Suggestive of inflammatory myopathy with infiltration of lymphocyte and degenerative changes in muscle tissue, consistent with polymyositis.

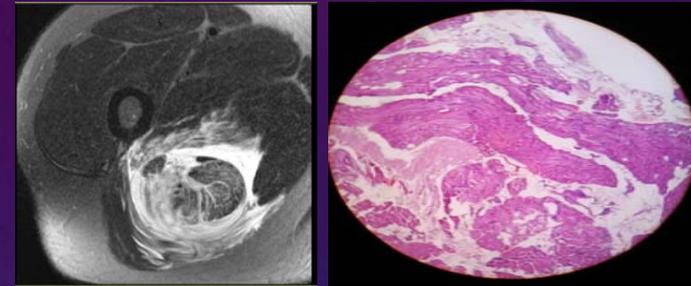


Fig 2 and 3: MRI of muscle showing Inflammation and HPE of muscle biopsy.

- CECT abdomen: Mesenteric inflammation with thickening and fat stranding with lymphadenopathy and ileocaecal inflammation with mucosal irregularity noted , suggestive of IBD.
- Colonoscopy: Multiple ulcer with intervening free mucosa in Caecum and terminal ileum.
- Colonoscopy guided biopsy: lamina propria infiltrated with large number of inflammatory cells, cryptitis seen, with epithelioid granuloma consistent with Crohn's disease.

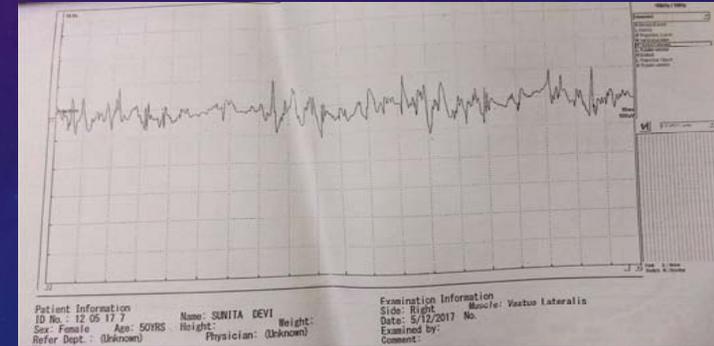


Fig 4: EMG showing myopathic pattern.

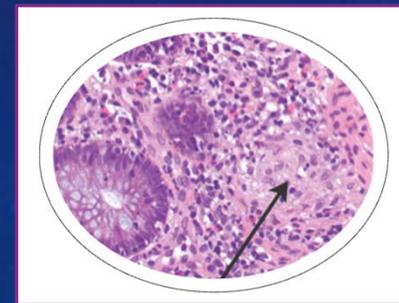
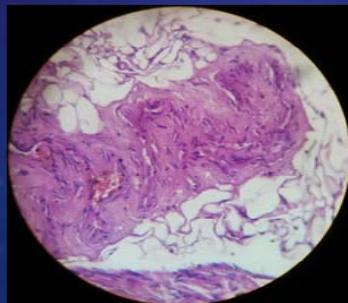
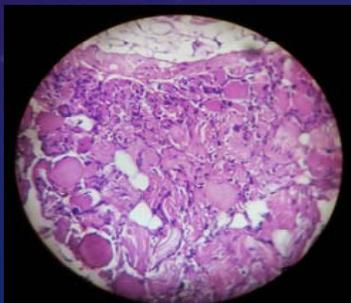


Fig 4 and 5 : HPE of Muscle biopsy showing inflammation and fibrosis

Fig 6 and 7 : Colonoscopy and HPE Showing CD lesions.

## Final Diagnosis:

Grave's disease presented with thyrotoxicosis complicated with polymyositis and Crohn's disease.

## Management:

- Patient managed with high dose Prednisolone, Propranolol and Carbimazole.
- Three month follow up after discharge was satisfactory with improvement in bowel habit and Jaundice was gradually subsiding, liver enzyme was normalised. Power of both upper limb was 4-/5 and lower limb was still 3/5 in proximal muscles.
- Patient was followed up after 3 months with improvement in bowel habit and power was 4-/5 in lower limb proximal muscle groups and continued to be same in upper limb.
- Patient was planned for Radio iodine ablation of the gland and unfortunately she has lost follow up.

## Discussion:

We have presented a case of Grave's disease associated with polymyositis and Crohn's disease. Crohn's disease may sometime be associated with hypothyroidism but Grave's disease presenting with thyrotoxicosis is extremely rare. Only 141 cases has been reported in literature focusing Crohn's disease with Grave's disease. Association of polymyositis with Grave's disease , again is a rare entity, so far very few cases has been reported. Although organ specific autoimmunity can be present in different combination of autoimmuno diseases, association of Grave's with polymyositis and Crohn's disease is extremely rare entity. Recognition of the condition is essential as per as management is concern. Thyroid myopathy may be a great mimicker of inflammatory myopathy like polymyositis and Crohn's disease can be overlooked as hyperthyroid bowel habit alteration. There is scarcity of cases reported like Grave's disease with polymyositis and Crohn's disease in a single patient in literature. Understanding of the disease and it's spectrum of presentation is paramount importance for proper management of the patient.

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# Mycophenolate-Induced GI Mucosal Injury – A Rare Iteration

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## Introduction

Mycophenolate mofetil (MMF) is an immunosuppressant widely used for the prevention of organ transplant rejection. MMF is effective at suppressing lymphocyte proliferation and thus acute organ rejection<sup>1</sup>.

Gastrointestinal (GI) side effects remain very common, including abdominal pain, nausea, vomiting and diarrhea<sup>2</sup>.

While these symptoms often occur without any evidence of direct mucosal damage, several studies have demonstrated evidence of MMF-induced injury in both the upper and lower GI tract.

Here we report a rare case of circumferential esophagitis and symptomatic esophageal stricture secondary to MMF.

## Case Presentation

A 46 year-old male underwent kidney transplant followed by immunosuppression with MMF, tacrolimus, and prednisone.

He noted new solid food dysphagia post-transplant which progressed over 6 months and was hospitalized with progressive nausea/vomiting and dysphagia.

Esophagogastroduodenoscopy (EGD) showed circumferential esophagitis about 10 cm above the gastro-esophageal junction with stenosis at 30 cm from the incisors.

Biopsies showed acute and chronic inflammation without increased eosinophils or evidence of Barrett's mucosa. Fungi, cytomegalovirus (CMV) and herpesvirus (HSV) stains were negative.

## Case con't

He was treated with endoscopic dilation and esomeprazole 40mg twice a day but was re-hospitalized due to persistent symptoms. Repeat EGDs once again showed esophagitis and stricture.

MMF was suspected to be the culprit due to the refractory nature of symptoms, location of lesions and lack of evidence for other etiologies. MMF was substituted with azathioprine. Barium swallow at 3-month follow-up showed no evidence of esophagitis or stricture.

No symptom recurrence occurred off proton pump inhibitor therapy at 2.5 year follow up.

## Images

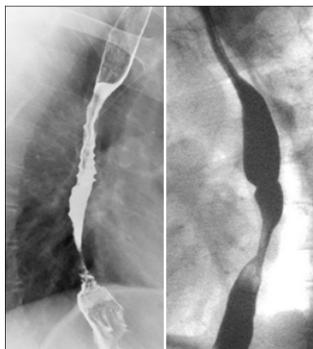


Fig. 1. Barium swallow in November 2013 showed a tight 3 cm long, 4 mm diameter stricture in the lower third of the esophagus.



Fig. 2. Normal barium swallow at 3 month follow-up.

## Discussion

MMF has well-known gastrointestinal adverse effects, including abdominal pain, nausea, vomiting and diarrhea<sup>1</sup>. While the entire GI tract is at increased risk of MMF toxicity, the lower GI tract appears to have been disproportionately affected with injuries that reflect the antimetabolite activity of MMF, resulting in GVHD-like changes such as colitis<sup>3,4</sup>.

Upper mucosal injuries have been described but more as local mucosal irritation, such as erosive esophagitis, reactive gastropathy-type changes and/or duodenal ulcers<sup>5,6</sup>.

Despite the increasing recognition of MMF-induced GI tract mucosal injury, we are reporting the first clinical case of circumferential esophagitis with stricture of which we are aware. Cessation of MMF and dilation of the stricture led to complete clinical, radiographic, and endoscopic resolution. Moreover, the lack of symptomatic recurrence in the absence of PPI therapy for the following several years further supports MMF-induced esophageal injury as the etiology.

In conclusion, a diagnosis of MMF-induced esophagitis, while rare, should be considered in a patient with dysphagia when more common etiologies have been excluded or when esophagitis is PPI refractory.

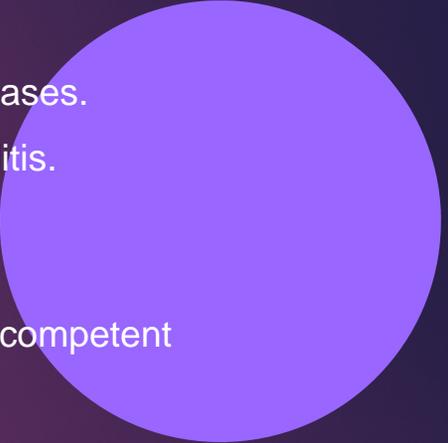
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***Cryptococcus neoformans* infective endocarditis of  
native valves in an immunocompetent host.**

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# Introduction



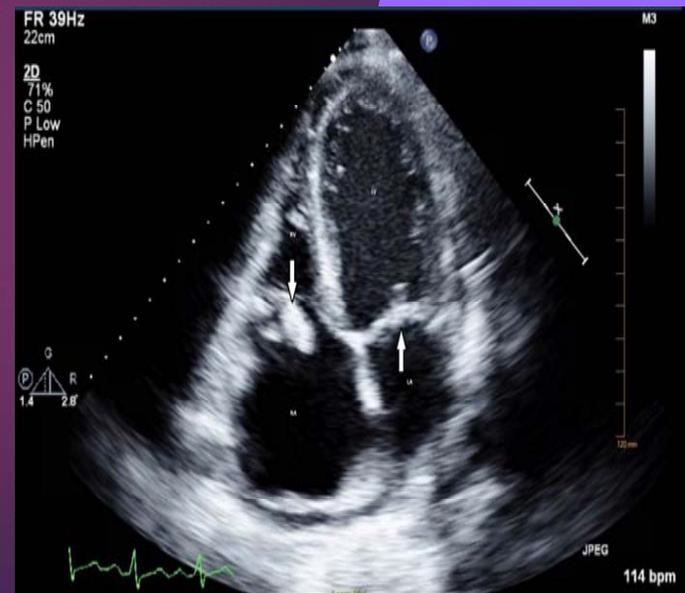
- ❖ Fungal endocarditis accounts for only 6% of infective endocarditis cases.
- ❖ Cryptococcus is a rare fungal pathogen to cause infective endocarditis.
- ❖ Cryptococcus infective endocarditis have been mostly reported in immunosuppressed hosts and in prosthetic heart valves.
- ❖ We present a rare case of Cryptococcus endocarditis in an immunocompetent host with involvement of native valves.

# Case Presentation

- ❖ A 26 year old immunocompetent male presented to outlying hospital after cardiac arrest and acute renal failure following drug overdose. Patient was started on hemodialysis but left against medical advice to be readmitted at another facility with shortness of breath.
- ❖ Patient was started on emergent dialysis on second admission but left against medical advice again while further work up was pending to be admitted at our hospital with signs and symptoms of acute heart failure.
- ❖ Physical Examination: Tachycardia (heart rate 123 beats per minute) and tachypnea (respiratory rate of 25 breaths per minute), jugular venous distension, bilateral lower extremity and scrotal edema.
- ❖ Tests and procedures: wbc- 13,000/uL, Hb- 10.4 g/dL, platelet- 100,000/uL. Potassium- 5.5 mmol/L, Serum creatinine- 7.08 mg/dL.

# Results

- ❖ **Transthoracic echocardiogram**- large mobile vegetation on the atrial surface of the tricuspid valve with severe tricuspid regurgitation(downward arrow).Severe global hypokinesis with systolic ejection fraction of 25% was also noted. An echogenic non-mobile structure was noted on the posterior mitral leaflet with moderate mitral regurgitation(upward arrow).



- ❖ **Transesophageal echocardiography (TEE)** confirmed a 2.2x1 centimeter (cm) mobile vegetation on anterior leaflet of tricuspid valve and 1.5x0.8 cm mobile density on the posterior tricuspid valve (downward arrow in figure 1). A 0.5x0.6 cm sessile echodensity was noted attached to posterior mitral valve that appeared calcified and consistent with old vegetation on the TEE (downward arrow in figure 2).



# Treatment

- ❖ While waiting to obtain records from other hospitals, patient was initially started vancomycin and gentamicin for suspected bacterial endocarditis.
- ❖ Fungal blood culture from outlying hospital was later obtained and showed growth of cryptococcus neoformans from 2/2 blood cultures.
- ❖ Liposomal Amphotericin-B 6milligram/kilogram and Fluconazole 400 milligram IV once daily was started once fungal cultures with growth of Cryptococcus were obtained.
- ❖ He was discharged home on oral Fluconazole 400 milligram every 48 hours after hemodialysis for 6 months. Flucytosine therapy was recommended but patient refused to take the medication due to concerns about side effects.

# Clinical Question.

- ❖ Our patient was diagnosed with *Cryptococcus neoformans* infective endocarditis which is an uncommon finding in immunocompetent host. Does the patient have undiagnosed immunosuppressed status?

- ❖ **Other tests done to rule out immunodeficiency --**

- ❖ HIV 1,2 screen HIV-1 RNA PCR- Negative
- ❖ C-Reactive Protein- 3.32 mg/dL
- ❖ Absolute CD4 count- 1328/ cubic milliliter
- ❖ C3 complement level- 114mg/dl
- ❖ C4 complement level- 25.4 mg/dl
- ❖ Hepatitis C antibody - positive
- ❖ Hepatitis C RNA PCR- Non detectable
- ❖ Immunoglobulin G- 1589 mg/dL
- ❖ Immunoglobulin A- 295 mg/dL
- ❖ Immunoglobulin M- 137 mg/dL

# Conclusion

- ❖ Most cases are minimally symptomatic and the infection is rapidly cleared by immune system.
- ❖ Disease in individuals with no apparent immunodeficiency is not very common.
- ❖ Cardiac involvement due to *Cryptococcus* infection can present with pericarditis, myocarditis and endocarditis, especially in immunocompromised host and in the presence of prosthetic valves.
- ❖ Cryptococcal endocarditis is extremely rare and has been reported in post-operative prosthetic valve infections.
- ❖ Lombardo et al reported the first case of *Cryptococcus* endocarditis in 1957.
- ❖ Our case is the first reported case of *Cryptococcus neoformans* endocarditis of native valve with no known history of underlying immunosuppressed state.
- ❖ Most case reports have emphasized the use of Amphotericin-B in the treatment of Cryptococcal endocarditis, with or without surgical intervention.

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**Acute Embolic Stroke in a young male Secondary to  
Non-Bacterial Thrombotic Endocarditis (NBTE)  
(Libman-Sacks Endocarditis)**

ACP | Internal  
Medicine  
Meeting



Mina Makary, MD, FACP, BCMAS

Geisinger

## Disclosure

**Dr. Mina Makary does not have any relevant financial relationships with any commercial interests.**



Geisinger

## Introduction

- Work up for CVA in young patient can be challenging, yet it is essential.
- Failure to diagnose the underlying cause of CVA may lead to catastrophic results.
- The etiologies and risk factors for arterial ischemic stroke in young adults differ from those typical in older adults.

## Case Description

### History:

- A 46- year-old male presented to the ED with weakness of left upper extremity, and slurred speech for seven hours.
- He has a 30-pack-year history of smoking.
- Unremarkable past medical, surgical, and family history.

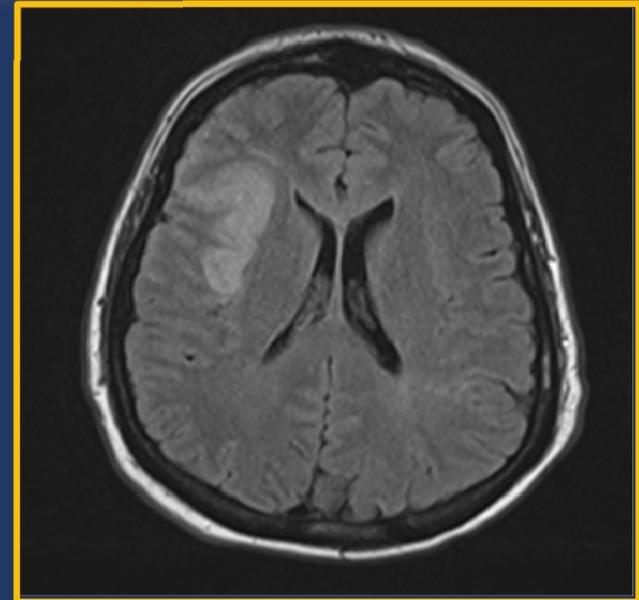
### Physical exam:

- Vital signs were within normal limits.
- Neurological exam showed pronator drift on the left side.
- Remaining of physical exam was unremarkable.

## Case Description

### Laboratory and Imaging Studies:

- Elevated CARDIOLIPIN AB IGG, and IGM.
- Brain MRI showed evolving acute to early subacute right frontal lobe and insular cortex infarction.
- Transthoracic Echocardiography was unremarkable.
- Trans Esophageal Echocardiogram (TEE) showed vegetations on the atrial surface of the anterior and posterior mitral leaflet.



## Discussion

- Non Bacterial Thrombotic Endocarditis (NBTE)
- Libman-Sacks Endocarditis
- Verrucous Endocarditis
- Marantic Endocarditis



A form of noninfectious endocarditis, that is characterized by the deposition of thrombi on heart valves

Mitral  
Aortic

Undamaged  
valves

↑ Tendency for  
vegetations to  
embolize

## Epidemiology



- NBTE is a rare condition, most often found postmortem with rates in autopsy series ranging from 0.9 to 1.6 % .
- It has been reported in every age group, most commonly affecting patients between the fourth and eighth decades of life.
- No sex predilection

## Pathogenesis



- NBTE is characterized by the deposition of sterile platelet thrombi on heart valves.
- The initiating factor in the pathogenesis of NBTE is unknown, but endothelial injury (by circulating cytokines, such as tumor necrosis factor or interleukin-1) in the setting of a hypercoagulable state is thought to be critical for the development of NBTE.

# Diagnosis of NBTE

A high index of clinical suspicion is critical for Diagnosis

Vegetations on  
echo

+

Absence of  
systemic  
infection

+

Patients who are  
at high risk of  
NBTE  
( Malignancy,  
SLE,RA, etc)

Strong evidence to support the  
diagnosis of NBTE

ACP | Internal  
Medicine  
Meeting



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# Treatment of NBTE

Systemic  
Anticoagulation  
(Indefinitely)

Treating the  
underlying malignancy  
or associated  
condition

Despite therapy the prognosis  
from NBTE is generally poor

# A CASE OF PERSISTENT AND RECURRENT VENTRICULAR FIBRILLATION WITH SUCCESSFUL RESUSCITATION AND GOOD NEUROLOGICAL OUTCOME

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# INTRODUCTION

- ▶ Shock resistant ventricular fibrillation (VF) is defined as VF persisting after three defibrillation attempts. (1) In approximately 10 - 25% of all cardiac arrests, shock-resistant VF develops, and 87 to 98% of those patients die. (2)
- ▶ Defibrillation is critical in the resuscitation of patients with cardiac arrest due to Ventricular tachycardia or ventricular fibrillation (VT/VF).
- ▶ Survival rates drop markedly if 5 or more shocks are required for either persistent or recurrent episodes of VF. (2)
- ▶ This is a report on a patient who survived and neurologically intact after 24 defibrillator shocks.

## CASE REPORT

- ▶ A 54 year-old, previously healthy, man walked into the Emergency Department with a one-hour history of retrosternal chest pain. He was experiencing intermittent chest pain for four days.
- ▶ Prior to this presentation he was a non-smoker and had no cardiovascular risk factors. He suffered a witnessed cardiac arrest while taking the electrocardiogram. And the first part of recording showed ST elevation in anterior leads and ventricular fibrillation (VF) in the later part. (figure 1) He was immediately started on advanced cardiac life support. Resuscitation was continued with strict accordance to European resuscitation council guidelines. Sinus rhythm and cardiac output was established after 40 minutes of resuscitation by giving 16 defibrillations, 5 doses of 1mg intravenous adrenaline, amiodarone 300mg intravenously and added dose of 150mg intravenously followed by a continuous infusion, intravenous calcium gluconate and intravenous magnesium sulphate. Last five defibrillations were given with keeping the pad anterior-posteriorly.

- ▶ Patient suffered two more episodes of ventricular fibrillation cardiac arrests each episode requiring four further defibrillations with keeping the pads anterior-posteriorly and 3 additional doses of intravenous adrenaline. Total number of defibrillator shocks received during his resuscitation was 24.
- ▶ Once he had a stable rhythm (figure 2) and cardiac output, he was sent for urgent primary percutaneous coronary intervention, which showed critical stenosis at ostium of Left anterior descending artery (LAD). He had angioplasty and stent placement to reestablish blood flow in the LAD. (figure 3,4) His post procedure echocardiogram revealed mild left ventricular dysfunction with anterior wall hypokinesia. Left ventricular ejection fraction was 50%.
- ▶ He was treated in the coronary care unit (CCU) during the next few days and treated with noradrenaline and abciximab infusion for first 24 hours. Fifth day at the CCU was complicated by aspiration pneumonia and acute renal failure. Both those complications managed satisfactorily with intravenous antibiotics and peritoneal dialysis respectively. He made a complete recovery without residual neurological deficits.
- ▶ He was well and completely asymptomatic with follow up in three months and 1 year.

Figure 1 - ECG on admission VF in lead V4R

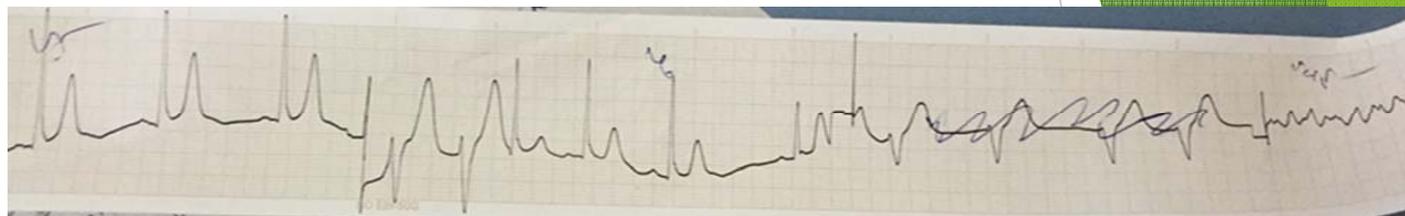
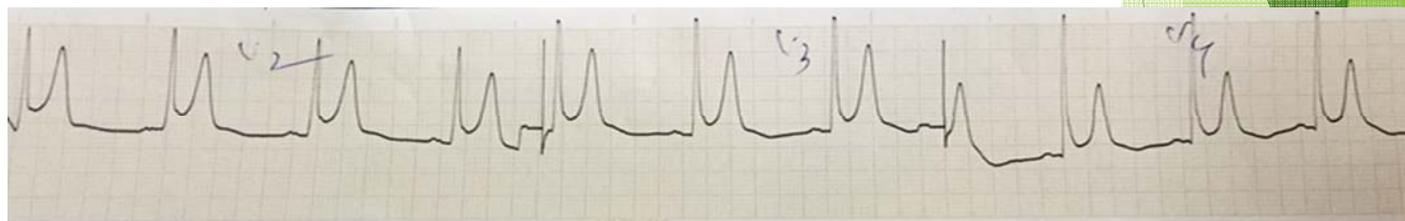


Figure 2 - ECG after stabilizing the patient



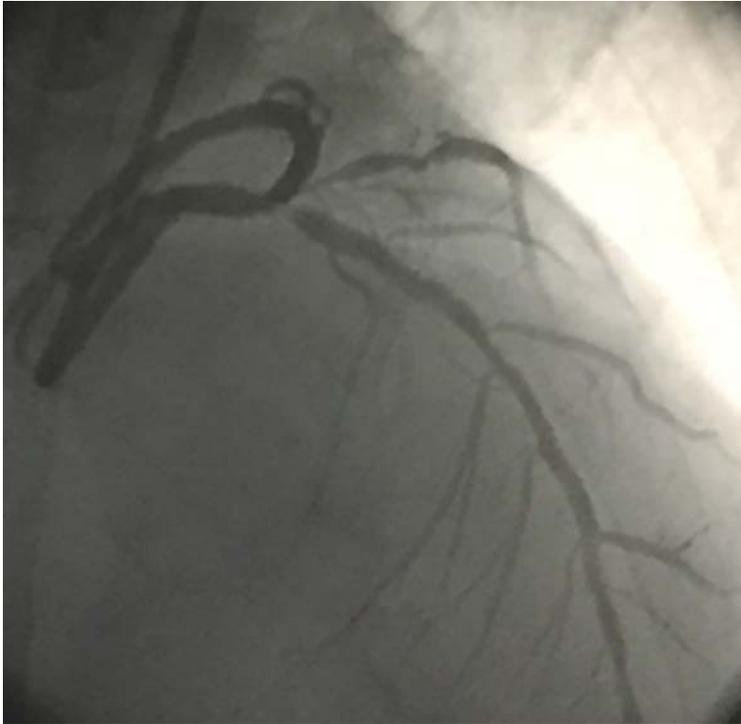


Figure 3 - Coronary angiogram showing critical stenosis of LAD

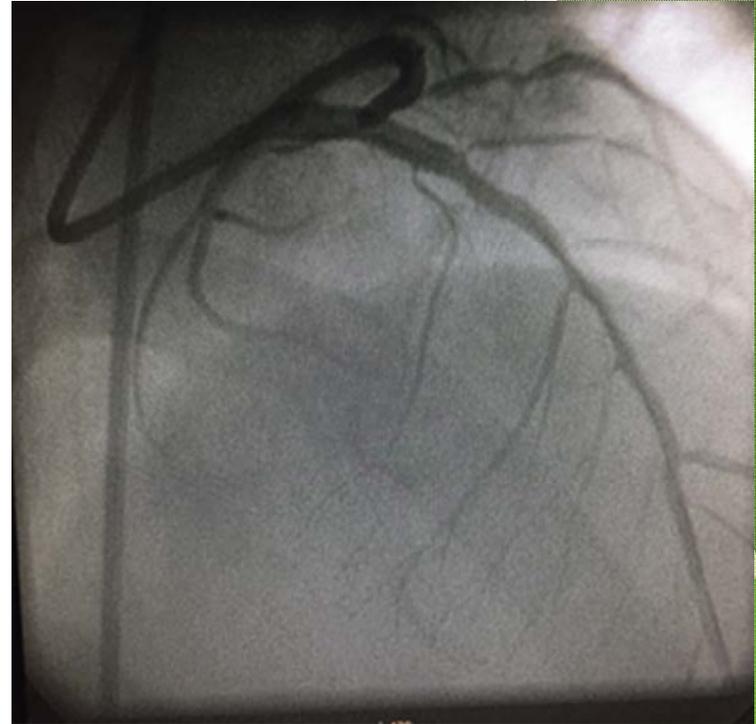


Figure 4 - Coronary angiogram after re-establishing blood flow

## DISCUSSION

- ▶ Over the past decades there have been great advances in both the standard and process of resuscitation, but the process of in-hospital resuscitation has remained relatively unchanged. Nonetheless, successful resuscitation and good recovery after prolonged arrest have been documented.(3,4,5)
- ▶ This case illustrates all the favorable factors in the chain of survival - early access, early CPR, early defibrillation and early advanced care. The patient was relatively young and previously well to deserve prolonged maximum effort of resuscitation.

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# Cutaneous Blastomycosis in an Immunocompetent Patient

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## INTRODUCTION

Blastomycosis presents as a variety of clinical manifestations most commonly involving the lungs or skin. Cutaneous findings include raised verrucous lesions, exudative ulcerations, nodules, pustules or keloid-like growths. While severe infections more commonly occur in those with suppressed immune systems, infection involving immunocompetent patients is well documented when exposure occurs in endemic regions. Known to frequently be misdiagnosed or result in delayed diagnosis, infection with *Blastomyces dermatitidis* should be part of the differential when skin findings fail to respond to otherwise standard therapies or develop atypical features.

## CASE DESCRIPTION

A 52-year-old Caucasian male with no known medical history presents to the emergency department after several months of recurrent skin lesions that are unimproved after multiple courses of antibiotics.

- Approximately four months ago, he developed a red, painful nodule on his medial left knee after a long motorcycle ride and completion of doxycycline for a "sinus infection."
- An I&D is performed, and he is given a second course of doxycycline for presumed MRSA abscess.
- Over the following weeks, he undergoes a second I&D of another developing lesion on the right arm and is told that cultures from this drainage are "negative for MRSA."
- Despite the results, he receives a course of trimethoprim-sulfamethoxazole and cephalexin with instructions on how to undergo chlorhexidine decontamination.
- As months pass, new lesions form on his thigh and chest.
- Frustrated, he begins using other topical remedies including bacitracin, Epsom salt, silver colloid and garlic supplement.
- One month prior to the current presentation, he again seeks evaluation when the initial area on his knee begins "crusting over" and draining clear, orange fluid.
- A script for oral clindamycin is written, which he finishes, noticing minimal improvement.



### Social History:

- Patient has never smoked and denies recreational drugs. He reports occasional alcohol usage with "craft beer" once weekly.
- He works as a fork lift operator at the convention center and was previously a salesman for HVAC systems.
- His only travel has been to Kentucky and Michigan.
- He owns several cats and dogs and has never been bitten, but admits they had significant "flea problems" six months ago.
- He is in a monogamous relationship with a female partner and denies history of known STI.

### Review of Systems:

- He denies fevers, chills, weight changes or night sweats.
- He has no fatigue, arthralgias, easy bleeding or bruising, or lesions of his oral or genital areas.
- He denies cough and shortness of breath.
- He denies pain except for tenderness over the lesions.

### Physical Exam:

- Vitals are unremarkable.
- Lungs are clear.
- There is no palpable inguinal or axillary lymphadenopathy.
- Several skin lesions of various evolution and characteristics are present on his right arm, chest, right thigh and left knee.

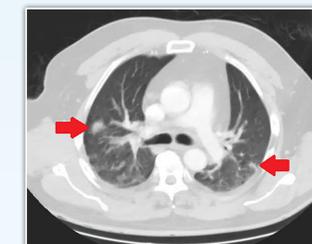
### Laboratory Data:

- CMP and CBC with differential are unremarkable.
- Screenings for HIV and Hepatitis C are negative.
- MRSA nasal swab PCR assay is negative.
- Within hours of performing a skin biopsy, the fungal stain indicates concern for *Blastomyces dermatitidis*.

## CLINICAL COURSE

- The patient is initiated on oral itraconazole therapy and given aggressive wound care.
- A chest CT finds few, small parenchymal opacities and mild mediastinal lymphadenopathy.
- A sinus CT, completed due to the history of "sinus infection," shows no evidence of disease.
- A *Blastomyces* urinary antigen EIA returns negative.
- Final pathology confirms cutaneous blastomycosis.

When further questioned to identify possible exposure history, he admits to spending many weekends clearing large plots of forest in Michigan in order to make a trail and then chop the felled trees for firewood. He returns for several follow up appointments over two months and reports progressive improvement of his skin lesions.



## DISCUSSION

During the course of his disease, the patient was evaluated by multiple providers with concern that alternative diagnoses were not more strongly considered. When encountering diagnostic dilemmas, physicians often unknowingly incorporate cognitive biases into their thought processes. Potential biases in this case include diagnosis momentum, premature closure and Sutton's slip. To counter this, the concept of analyzing one's own thought process, metacognition, has been recommended as one modality to minimize diagnostic errors that result from failed heuristics.

Blastomycosis often mimics other disease processes and is fairly prevalent within endemic regions. When the expected disease presentation or treatment outcomes for cutaneous lesions are not observed, blastomycosis can be a reasonable consideration.

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# Are My Lungs Pink?

## Introduction

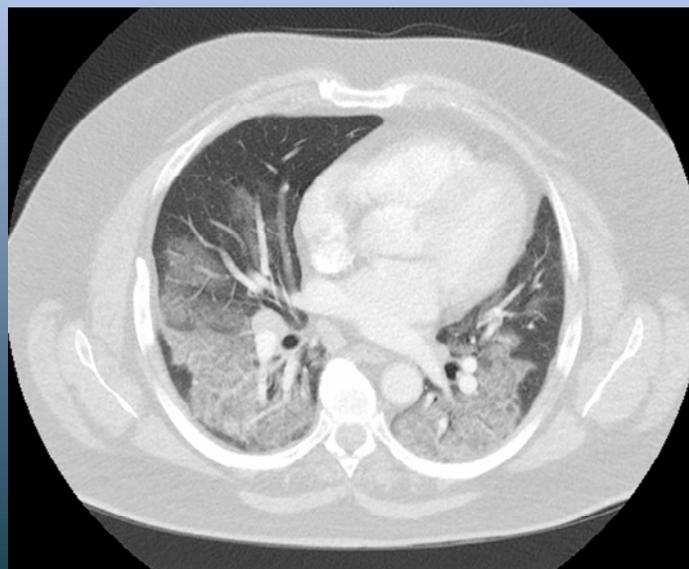
- Acute Eosinophilic Pneumonia (AEP) is a rare, life threatening disease that usually presents as an acute hypoxemic respiratory failure.
- It can be associated with medications, parasitic infections or fungal infections.
- Only few cases reported to be associated with cocaine and heroin inhalation.
- Here we report a case of AEP secondary to heroin inhalation.

## Case

- A 60 year old male with HTN, diastolic CHF, OSA and 30 pack years of cigarette smoking and occasional heroin inhalation presented to the emergency department with progressive cough and dyspnea for about a week.
- On admission patient was afebrile, HR 101 bpm, RR 24/min, BP 133/69 mmHg and saturating 85% on room air. Physical exam was notable for bibasilar inspiratory crackles and chronic bilateral leg edema. Labs revealed WBC  $21.6 \times 10^9/L$  with 80% neutrophils, 1.3% eosinophils. Arterial blood gas showed pH 7.42, PaCo<sub>2</sub> 43, PaO<sub>2</sub> 60 and bicarbonate 28 on 4L oxygen. BNP was 104 ng/L.
- Chest x-ray revealed patchy opacities in both lower lobes. CTA chest was negative for pulmonary embolism but showed bilateral ground glass opacities predominantly in the lower lobes.(see figure). Urine drug screen was positive for opiates.
- Patient was admitted with working diagnosis of community acquired bacterial pneumonia and was started on ceftriaxone, azithromycin and 4L oxygen by nasal cannula. Urinary pneumococcal and legionella antigens were negative. Mycoplasma, influenza and HIV serologies negative.

## Case

- Patient's clinical status and hypoxemia continued to worsen requiring high flow oxygen and bi-level positive pressure ventilation despite several days of antibiotic treatment.
- Bronchoscopy with broncho alveolar lavage was done for further work up, which revealed 46% eosinophils, establishing diagnosis of AEP.
- Antibiotics were then discontinued and therapy with methyl prednisolone was initiated with remarkable improvement in clinical and radiologic findings within 48 hours with successful transitioning to room air.
- Bronchial cultures were negative for bacteria, fungus, AFB and pneumocystis. Sputum and blood cultures also remained negative.
- Patient was eventually discharged home on prednisone taper and was doing well on follow up.



CTA Chest with bilateral ground glass opacities

## Discussion

- AEP is due to infiltration of lung tissue by eosinophils and thus impair gaseous exchange.
- Patients with AEP typically present with rapidly progressive dyspnea, cough and fevers of less than a week accompanied by severe hypoxemia with high alveolo-arterial gradient and bilateral lung infiltrates.
- It is frequently misdiagnosed as severe community acquired pneumonia (CAP).
- These patients present without peripheral eosinophilia but typically have more than 25% eosinophils in the bronchoalveolar fluid.
- AEP is treated with glucocorticoids, respiratory support and avoidance of any recognized triggers.

## Conclusion

We emphasize that AEP should be considered as a differential diagnosis of acute lung injury in patients who fail to respond with appropriate antibiotic therapy especially because of its excellent prognosis.

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# A Rare Case of Postpartum Weakness and its Impact on a New Mother

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## Objectives

1. Rare complication of influenza vaccine
2. Evaluation of postpartum fatigue with neurological changes

## Introduction

### Influenza Vaccine and Pregnancy

- Women in all stages of pregnancy should be vaccinated against influenza<sup>1</sup>
- *Common side effects:* injection skin reaction, fainting, headache, muscle aches, nausea, fatigue<sup>1</sup>
- *Adverse complication:* Guillain Barre Syndrome (GBS)<sup>2</sup>

### Guillain Barre Syndrome and Influenza vaccine

- *Initial link:* New Jersey 1976: 500 GBS cases were linked to influenza vaccine<sup>2</sup>
- Most common severe adverse reaction of influenza vaccine
- *Definition:* Acute polyneuropathy which presents as inflammatory demyelinating polyradiculopathy
- *Epidemiology:* 1/100,000 Vaccinations<sup>2</sup>
- *Etiology:* Post vaccination immune mediated
- *Sequela:* Flaccid bilateral paresis<sup>3</sup>

### GBS and Pregnancy

- Prevalence by trimester: 1<sup>st</sup>: 13%, 2<sup>nd</sup>: 47%, 3<sup>rd</sup>: 40%<sup>4</sup>
- Prevalence during postpartum is unknown
- Early diagnosis is essential
- Treatment has proven to be safe in pregnant women

### Postpartum Vaccination associated weakness:

- Consider GBS as a differential

## Case Presentation

**CC:** Fatigue, weakness and paresthesia

**HPI:** 24 y/o F (G1P1) 8 weeks postpartum with fatigue and lip, arm, and leg paresthesia for 1 month following influenza vaccination.

**PMH:** GERD, Gestational HTN, Asthma, Chronic Pancreatitis

**Meds:** None

**Allergies:** None

**PSH:** None

**Social Hx:** Unremarkable

**Family Hx:** None

**Vitals:** P 80, BP 125/80, Pulse ox 100% on RA, T 98, BMI 34

**PE:**

- General: AAOX1, obese
- Neuro: decreased deep tendon reflexes, CN 2-12 intact, global weakness
- Heart, lungs, GI: wnl.
- Exam limited due to mental status.

**Labs:**

8	12.1	323	137	99	21	135
	35		4.1	24	0.9	

- ESR 23; Vitamin B12 wnl
- Lyme IgM, IgG: Negative
- PT, PTT, INR wnl
- UDS and serum EtOH: Negative
- UA: wnl
- Urine and Blood culture: No growth

**Imaging:** CT Brain, MRI brain and Lumbar spine: wnl.

**Lumbar Puncture:** Protein 86, Glucose 56, Normal cell count

**Diagnosis:** Post-influenza vaccination induced GBS

**Treatment:** Intravenous Immunoglobulin

## Discussion

- All pregnant and postpartum women should receive influenza vaccine<sup>1</sup>
- Sequelae of influenza can be potentially fatal
- Weighing the risks and benefits of vaccinations is fundamental
- Patients should be educated on side effects of influenza vaccine including GBS
- Postpartum period is crucial and important
- GBS related paralysis can effect infant bonding and nurturing
- Early detection of GBS would prevent delays in treatment and would improve a woman's postpartum experience
- IVIG treatment is safe in postpartum women<sup>5</sup>

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# Bilateral Facial Nerve Palsies Due to Disseminated Lyme Disease

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## Introduction

Bilateral facial nerve palsy is a rare entity representing less than 2% of all facial nerve palsies and is rarely related to Bell's palsy. Determining the etiology can be a diagnostic challenge and requires consideration of underlying neurologic, infectious, neoplastic, traumatic and metabolic disorders.

## Case Presentation

A 22 year-old female presented to the hospital with:

- Headache, shoulder pain, slurred speech for several weeks
- 2 days of progressive bilateral facial droop, perioral numbness, drooling of saliva, inability to fully close eyelids
- No neck stiffness, headache, fever, photosensitivity
- Evaluated at a local hospital 3 days prior, diagnosed with Bell's palsy, given steroids and sent home
- Medical history significant for a tick bite sustained 3.5 weeks earlier while on a camping trip
- No history of trauma or drug use.

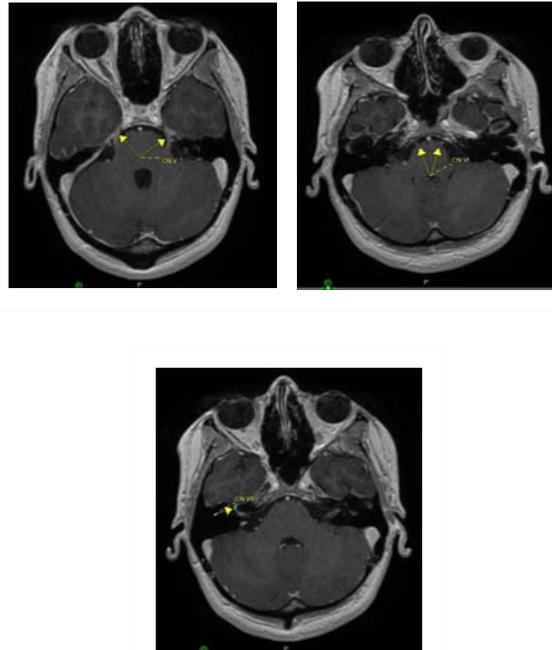
### Physical Exam:

- Bilateral cranial nerve VII palsies
- Drooling, slurred speech, lagophthalmos
- Strength, sensation, cerebellar testing and all other cranial nerves intact
- Ophthalmologic exam did not reveal any keratopathy, papilledema, or papillitis

## Laboratory Data

- Chemistries, LFTs, CBC unremarkable
- EBV IgG +, IgM -
- HIV -
- CSF: 31 WBCs, 13 RBCs, 91% lymphocytes, protein 94 g/L, cultures without growth, VDRL -, ACE level -, oligoclonal bands -, lyme PCR -
- CT head and CXR: No acute disease
- **MRI brain: Bilateral enhancement of cranial nerves 3, 5-7**
- **Initial Lyme IgG -, IgM +**

MRI brain revealed enhancement  
around multiple cranial nerves (3, and  
5-7 pictured below)



## Clinical Course

She received three weeks of IV Ceftriaxone therapy for disseminated lyme disease at the recommendation of the neurology and infectious disease services. At her follow-up visit three months later her symptoms had almost completely resolved. Repeat testing for lyme antibodies one month after treatment showed she was IgM and IgG positive at that time.

## Discussion

The most common causes of bilateral facial nerve palsies include trauma, Guillain-Barre Syndrome, sarcoidosis, HIV or EBV infection, meningitis, brain stem encephalitis, leukemia, syphilis, and lyme disease.

Disseminated lyme disease is the most common **infectious** cause

- **Cranial nerve VII is most commonly involved** though any cranial nerve can be affected
  - Occurs **weeks to months** after initial tick bite
- Diagnosis based on **exposure to infected tick + presence of IgM/IgG antibodies for *B. burgdorferi***
- **Antibodies are highly sensitive and specific** for infection when coupled with clinical symptoms (1)
- IgM antibodies appears within 1-2 weeks in individuals with disseminated infection
- IgG antibodies take 2-6 weeks to form (2)
- Persistence of antibody response varies with time and treatment
- **CSF lyme antibodies and lyme PCR are less sensitive and specific** and do not rule out infection (3)

### Key Points:

- Lyme disease is a common cause of facial nerve palsy in endemic areas
- Antibody response varies with time and treatment so initiate a diagnostic work-up ASAP when a patient presents
- Bilateral facial nerve palsies typically reflect an underlying systemic etiology requiring thorough assessment.
- Establishing the cause of bilateral facial nerve palsies is very important because the treatment and prognosis depends on the etiology.

## References

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3. Nocton JJ, Bloom BJ, Rutledge BJ, et al. Detection of *Borrelia burgdorferi* DNA by polymerase chain reaction in cerebrospinal fluid in Lyme neuroborreliosis. J Infect Dis 1996; 174:623.

# Can blastic lesions in bones be benign?

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## Introduction

- Back pain is a common complaint in outpatient, urgent care, ED<sup>1</sup>
- Persistent back pain is evaluated by imaging studies<sup>2</sup>
- Incidental finding of blastic lesions on imaging is concerning
- Most common differential for bony blastic lesions- metastatic cancer
- However, there are benign conditions that can also cause blastic lesions in bones

## Learning Objectives

1. Evaluation of blastic lesions when found incidentally on imaging studies
2. Distinguishing between a benign and malignant disease

## Case Presentation

- **HPI:** 27 y/o Caucasian male c/o of mid back pain for 2 months after fall. Pain is dull, 3/10, intermittent, improves with OTC analgesics and worsens with activity
- **ROS:** Negative for weakness, fatigue, loss of strength in extremities, weight loss, morning stiffness and fever
- **PMHx, PSHx:** None
- **Social Hx:** non-smoker
- **Family Hx :** Negative for cancer
- **PE:**
  - BMI 28
  - MSK: TTP over thoracic spine and bilateral ribs, no scoliosis or kyphosis, ROM of all joints
  - Neuro, cardiac and lung exam was unremarkable
- **Imaging studies:**
  - *X-Ray* thoracic spine and ribs: Randomly distributed innumerable sclerotic blastic densities of varying sizes without adjacent bony destruction or expansion
  - *CT scan* chest, abdomen and pelvis: Consistent with the bony findings found on X-Ray along with additional similar lesions in sternum without any other abnormalities
  - *Bone scan:* Scintigraphically normal without any focus of activity
- **Labs:**
  - Low Vitamin D 25-OH 9.8 [normal 32-100ng/ml].
  - CBC, CMP, TSH, ESR, CRP, SPEP, UPEP, PSA, hepatitis A, B, C panel were normal

## Discussion

- Given X-ray findings, initial concern was of osteoblastic metastasis
- Since negative bone scan and biomarkers, blastic lesions found on imaging studies are latent
- **Diagnosis:** Osteopoikilosis
- Rare inherited (autosomal dominant) condition characterized by numerous blastic bony lesions that are benign<sup>3</sup>
- Usually asymptomatic, found incidentally on imaging
- These lesions require no treatment or further workup
- Symptoms of pain can be managed by nonsteroidal anti-inflammatory or opioid analgesics

## References

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# **Under the skin: a history of panniculitis, opportunity and perseverance**



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# Disclosure



The authors do not have anything to disclose.

# Case description



- A 27-year-old Peruvian man presented with a four-year history of episodic fevers, weight loss, malaise and abdominal pain.
- Each episode lasted several weeks until spontaneous resolution.
- On exam, he had multiple non-tender cervical, axillar and inguinal lymphadenopathies bilaterally.
- Lungs had scattered rhonchi and his abdomen was diffusely tender; hepatomegaly was noted.

# Case description



His past medical history included:

- Intestinal obstruction (9 years ago).
- Esophageal stenosis (8 years ago).
- Hospitalization for similar complaints (4 years ago) during which he was treated with empiric antituberculous drugs without clinical improvement.

# Diagnostic tests



- Microcytic anemia (hemoglobin: 5.9 mg/dL) and polyclonal dysproteinemia on electrophoresis.
- ESR and CRP were elevated.
- Other biochemical tests, urinalysis and coagulation profile were normal.
- Standard bacterial, fungal, nocardial and mycobacterial cultures from blood, urine, bone marrow, stool and bronchial secretions were negative. Serology for HIV, hepatitis, HTLV-1, Brucella and syphilis were negative.

# Diagnostic tests



- ANA, ANCA, and rheumatoid factor were also negative.
- Computed tomographic scans showed bilateral pulmonary consolidation in lower lobes with interstitial pattern, hepatosplenomegaly, bilateral hydronephrosis, small amount of free peritoneal fluid and enlarged mediastinal, hilar and retroperitoneal lymph nodes.
- Biopsies of bronchial mucosae, lymph nodes, bone marrow and liver did not show malignancy, granulomas or necrosis.

# Hospital course



- Clinical course was complicated by appearance of erythematous, indurated, nodular skin lesions in neck and upper extremities lasting 2-3 days (Figure 1).
- At this point, we considered a possible diagnosis of panniculitis.
- Alpha-1 antitrypsine level in serum was normal.

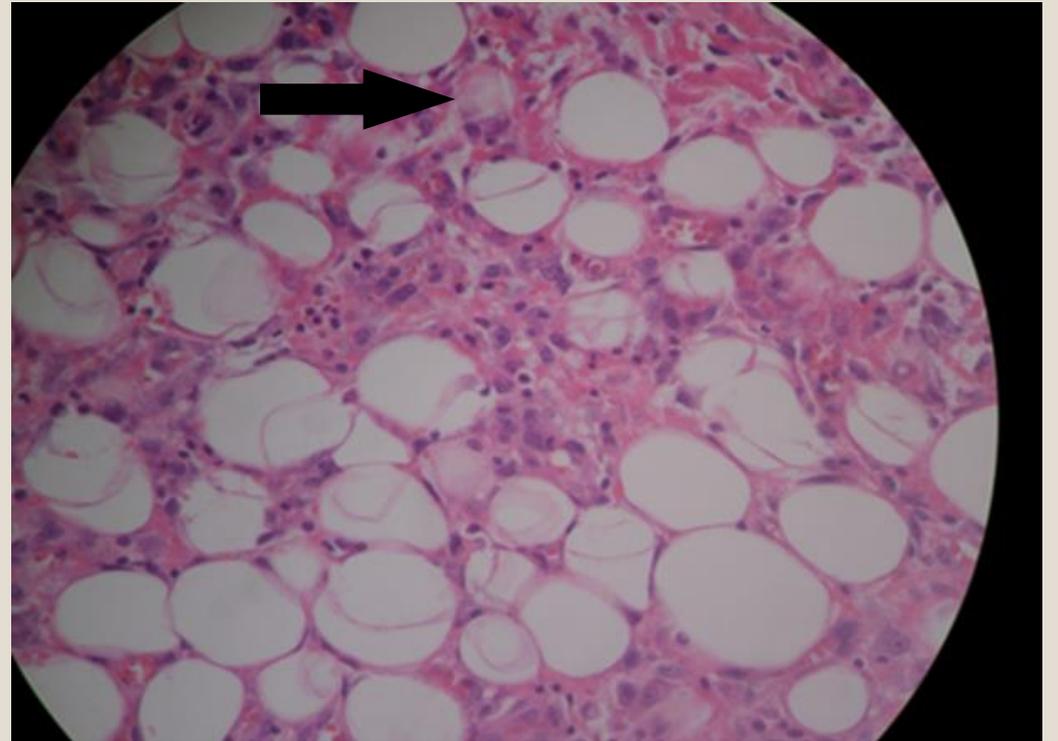


**Figure 1.** Elevated and erythematous lesion in anterior cervical region.

# Hospital course



- The patient underwent skin biopsy which showed unspecific inflammatory changes.
- A second biopsy was done which demonstrated interlobulillar neutrophilic-lymphocytic fat infiltration without vasculitis and foamy lipophages which are characteristic of idiopathic lobular panniculitis.
- The patient received prednisone and azathioprine with complete resolution of symptoms.



**Figure 2.** Pathology seen infiltrate seen neutrophil/lymphocyte infiltrate, arrow mark characteristic lipophages.

# Discussion



- Idiopathic lobular panniculitis (ILP), formerly known as Weber-Christian disease is very rare.
- Its etiology and prevalence are unknown.
- ILP is characterized by recurrent erythematous skin nodules with focal inflammation associated with systemic symptoms.
- Visceral fat can be affected; involvement of liver, lung, heart, spleen and adrenal glands has been reported. Visceral involvement has been associated with a significant mortality.
- Although rare, it can cause mesenteritis, intestinal obstruction or ureteral dilatation.

# Discussion



- The diagnosis is primarily made by skin biopsy.
- Systemic steroids and immunosuppressants are cornerstone in treatment.
- The diagnosis is challenging due to its non-specific clinical manifestations and infrequency.
- The initial differential diagnosis for this patient included disseminated tuberculosis which is endemic in Peru and can have a similar presentation.
- Histopathological confirmation can be difficult due to transient nature of skin lesions but it is ultimately the most reliable diagnostic tool.
- Persistence is key when pursuing a diagnosis of ILP.

# NATIONAL ABSTRACT COMPETITION EARLY CAREER PHYSICIANS



RESEARCH POSTER PRESENTATIONS

# Improving Compliance with Telemetry Guidelines

Sabina Safder, MD, Kelli Miller, RN

## Introduction

With concern for increasing healthcare costs there is a nationwide movement towards improving efficiency and reducing waste. One target of such evaluation is Telemetry use. Telemetry monitoring is a limited, costly resource that is routinely incorrectly deployed and overutilized. Despite focus on this issue from national organizations such as ABIM, hospitals across the country are working on ways to reduce its inappropriate use.

We evaluate a provider education based intervention to reduce inappropriate telemetry use.

## Methods

**Design:** Retrospective chart review consisting of 3 week blocks. 3 weeks of telemetry utilization before intervention and 3 weeks of telemetry utilization after intervention was reviewed.

**Participants:** Non ICU patients admitted to the hospitalist service receiving telemetry at Hutchinson Regional Medical Center in Kansas

**Intervention:** A handout was constructed according to American College of Cardiology (ACC) and Society of Hospital Medicine (SHM) guidelines for indication and duration of telemetry use. This handout was distributed to providers, nursing staff and posted at each nursing unit.

**Outcome Measure:** The number of telemetry days that were not associated with an accepted indication (per ACC and SHM guidelines) before and after intervention. Cost associated with inappropriate use of telemetry was calculated using the daily telemetry charge billed to patients.

## Results

In the 3 week pre-intervention period, 197 patients met inclusion criteria. They received 199 days of inappropriate telemetry monitoring, including both for incorrect indication or inappropriate duration. Common inappropriate indications included COPD exacerbation, localized infection without sepsis while inappropriate duration of monitoring was seen most commonly in Sepsis, Heart Failure exacerbations and tachyarrhythmias. The charge for the 197 days was \$131,340.

In the post intervention 3 week period, 153 patients were found to be monitored via telemetry and 134 days of inappropriate telemetry monitoring was noted. The associated charge was \$88,440. The pre and post change was found to be statistically significant with t test analysis with  $P < 0.03$ .

## Conclusion

There was a decrease in the number of patients on telemetry and the number of days of inappropriate telemetry use after our intervention. This was found to be statistically significant. This led to a nearly \$43,000 decrease in charges billed to patients.

Establishing clear guidelines and educating providers and nursing staff helps raise awareness for appropriate usage of telemetry monitoring. Reducing the cost associated with unnecessary monitoring is a step towards reducing overall healthcare costs and transforming our healthcare system all while providing higher quality care.

We used a quasi-experimental nonequivalent group design so there are some limitations to our study. We cannot infer causality because of unmeasured secular trends that could be possibly influencing the results. The idea of regression to the mean could also be in effect as we measured only two time periods.

# AHA GUIDELINES FOR TELEMETRY USE

- . Indefinite (Until resolution/definitive intervention)
  - Post-Cardiac arrest
  - Temporary pacing
  - High-grade AV block
  - Post-cardiac surgery
  - Arrhythmias
  - New onset bradyarrhythmia
  - Overdose of pro-arrhythmic agent
  - Severe hypokalemia or hypomagnesemia
- . 48 Hours
  - Acute decompensated heart failure
  - Acute MI
  - Syncope of unknown etiology
  - Post-non cardiac surgery (high risk)
  - Acute neurologic event
- . 24 Hours
  - Post-pacemaker/ablation/ICD
  - Chest pain syndrome
  - Uncontrolled atrial tachyarrhythmia
  - Initiation of drug known to cause torsades de pointes/QTC prolongation
- . Special cases outside of the guidelines but per recommendation from the Society of Hospital Medicine that allow for telemetry use for at-least 24 hours:
  - Sepsis in Elderly or severe sepsis in any age (Discontinue when sepsis resolved or when hemodynamically stable for 24 hours)
  - Severe alcohol withdrawal (discontinue when withdrawal resolves)
  - Uncomplicated PE-hemodynamically stable (24 hours)
  - Any severe electrolyte disturbance (discontinue when resolved)

# Focused cardiac ultrasound performance by general internal medicine faculty during a 6-month point-of-care ultrasound curriculum

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# Disclosures

- The authors have no disclosures



# Background

- Point-of-care ultrasound (POCUS) education is rapidly expanding in internal medicine residencies, but lack of faculty is a barrier<sup>1</sup>
- POCUS skills decay over time without practice and feedback<sup>2-3</sup>
- POCUS faculty development can improve self-reported confidence,<sup>4</sup> but higher-level outcomes have not been reported
- We implemented a faculty development curriculum and assessed participants' performance of focused cardiac ultrasound (FCU) skills over 6 months

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# Methods

- Setting: Midwestern academic medical center
- Participants:
  - 9 GIM clinician-educators enrolled in POCUS curriculum
  - 3 cardiology fellows (level 1 echocardiography training)
  - 3 diagnostic cardiac sonographers (gold standard)

## POCUS Curriculum for Internal Medicine Faculty†

Weekly	Monthly	Bimonthly Workshops (Hours)
Peer group practice*	Didactic lectures*	Fundamentals, Cardiac, Lung* (8)
Individual practice	Group image review*	Abdominal & Vascular* (2)
	Online case-based quiz	Procedural* (2)
	Online & textbook assignments	POCUS Protocols* (2)

† April-October 2016

\*Curricular elements qualifying for CME credits.



# Evaluation

- Primary outcome:
  - FCU efficiency score<sup>1</sup> = Image quality score/exam duration
  - Scored by 2 blinded cardiologist
- FCU Observable Structured Clinical Examination:
  - Baseline (after intro workshop), 3 months, & 6 months
  - 3 standardized patients: 2 females, age 48-79, BMI 23-39
  - FCU exam views:
    - Parasternal long axis
    - Parasternal short axis: aortic valve, mitral valve, mid-ventricle, and apex
    - Apical 4-chamber
    - Subcostal long axis & IVC

1. Gaudet J, Waechter J, McLaughlin K, Ferland A, Godinez T, Bands C, Boucher P, Lockyer J. Focused Critical Care Echocardiography: Development and Evaluation of an Image Acquisition Assessment Tool. Crit Care Med. 2016 Jun;44(6):e329-35.



# Analysis

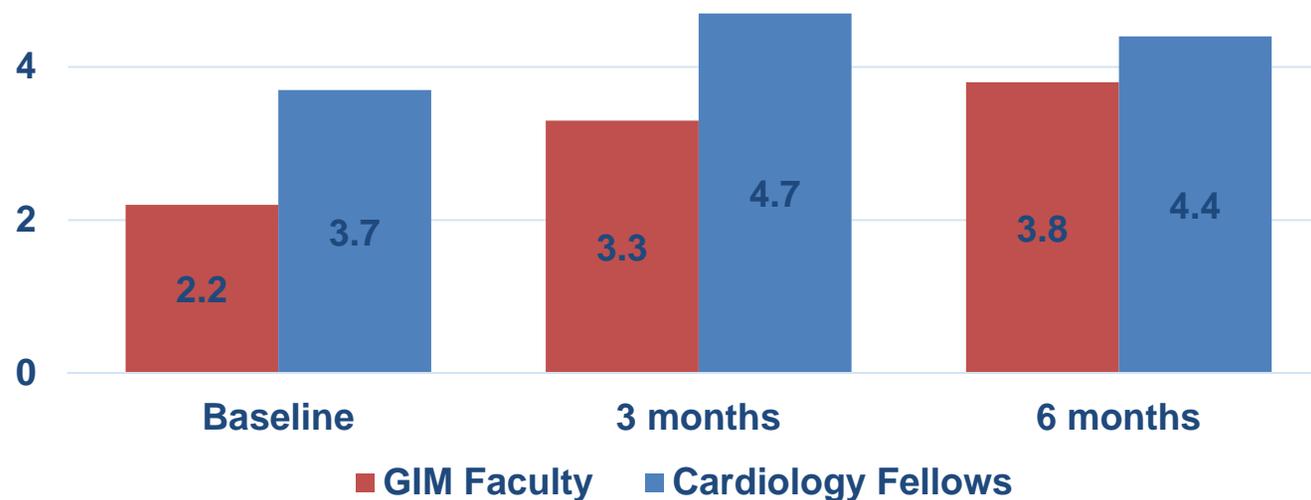
- Mean FCU efficiency scores and sub-scores compared using a linear mixed effects model with random effects for SP and participant and fixed effects for session and group.
  - Tukey's test comparing 3 groups for each session if interaction significant
  - Pairwise comparison combining groups and sessions if not significant



# Results

- 8/9 participants (89%) completed all 3 sessions. Mean CME credits 29 hours/participant.
- GIM faculty efficiency scores sustained over 6 months and comparable to cardiology fellows (p>.69 for all 3 sessions)

FCU efficiency scores for GIM faculty and cardiology fellows



## FCU Image Quality Scores & Exam Duration\*

	<u>Max Score</u>	<u>GIM Faculty</u>	<u>Cardiology Fellows</u>	<u>p-value</u>
Parasternal Long	12	8.65 (0.71)	9.63 (0.94)	0.50
Parasternal Short	18	11.04 (0.91)	14.50 (1.34)	0.04
Apical 4 Chamber	10	6.02 (0.79)	8.13 (0.99)	0.04
Subcostal Long	8	4.16 (1.28)	5.22 (1.43)	0.46
Subcostal IVC	6	2.49 (0.99)	3.63 (1.04)	0.03
Diagnostic Quality	12	8.59 (1.00)	9.52 (1.16)	0.52
Total	66	40.81 (5.02)	50.63 (6.00)	0.04

	GIM Faculty	Cardiology Fellows	p-value
Exam duration (minutes)	15.3 (1.4)	13.8 (1.8)	0.64

\*Standard error reported in parentheses





# Discussion

- GIM faculty participating in a voluntary, multi-modal curriculum maintained their FCU acquisition skills and performed equally well as experienced cardiology fellows over a 6-month period.
- Efficiency scores similar to those previously reported by critical care physicians with advanced training
- Total image quality score lower than cardiology fellows, but overall diagnostic quality comparable
- Findings support longitudinal curricula with regular practice and feedback when training POCUS to novice faculty.



# Contact

- Please email with questions or to discuss future collaboration!
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  - Tabatha Matthias: [tabatha.matthias@unmc.edu](mailto:tabatha.matthias@unmc.edu)





# Use of dictation as a tool to decrease documentation errors in electronic health records

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## INTRODUCTION

- The use of Electronic Health Records (EHR) among health care providers is rapidly increasing.
- The use of EMR has been shown to improve the quality of medical documentation and also reduce both medical error and mortality rates.
- Implementation of EMR has led to an increase in the time spent completing notes, resulting in an increased use of the copy-and-paste function by physicians.
- The aim of this study was to determine the effect of implementing a dictation system (front-end speech recognition technology) for completing notes on the quality of clinical documentation.

## METHODS

- A prospective interventional study in inpatient medical service for six months' duration starting in July 2016.
- Resident physicians' charts were reviewed by the attending physician on a daily basis.
- Residents' physicians included Internal Medicine, Transitional year and Combined Internal Medicine Pediatrics residents.
- Charts reviewed for hospitalized patients. A total of 54 residents were offered a pre-intervention survey indicating their subjective use of copy/paste function. Response rate of 85.18%.
- Progress notes were reviewed on a daily basis for residents on their inpatient rotation. A total of 621 notes were reviewed.

## RESULTS

- Almost 98% of the surveyed residents reported using the copy-and-paste function, while only 15.56% thought about the associated negative consequences in patient care.
- More than half of the resident physicians believe that copying and pasting will result in redundant Notes.
- The percentage of notes copied prior to the intervention was 92.73%, which decreased to 49.71% post-intervention (RR of 0.54, 95% CI 0.48 0.60 Z statistic 11.005 with p-value <0.0001).
- Of the copied notes, the percentage of errors pre-intervention was 58%; no errors were identified post-intervention (RR of 0.005, 95% CI 0.0003 0.0795 Z statistic 3.752 with p-value 0.0002).

Table 3. Results.

Parameter	Pre-intervention (%)	Post-intervention (%)
Copied notes	92.73	49.71
Copied from the same author	86.67	95.93
Documentation error in copied notes	58.04	0
Documentation error when note copied from same author	85.81	0
Documentation error when note copied from different author	14.19	0

Table 4. Documentation errors.

Documentation error	Example	Frequency
Physical examination	Patient is disoriented to time	74
Subjective patient information	Patient reported constipation	50
Diagnosis	SIRS criteria with no identifiable infection	28
Medications	Continue Rocephin day 4	10

Frequency of errors is higher than the total number of errors because of multiple errors per one note.

## DISCUSSION

- Our study is the first intervention study using a dictation system to reduce the rate of copying and pasting and the rate of errors in documentation.
- The implementation of the dictation system across our teaching community hospital was associated with a decrease in the rate of copying and pasting and eradication of errors in progress notes.
- Our findings provide insight into differences between residents' perceptions about copying and pasting and the actual incidence of copying and pasting. The most common reason our resident physicians attributed the use of the copy-and paste function was saving time.
- The results of this intervention study should encourage other residency programs to implement a dictation system since it leads to a significant reduction in documentation errors, which might lead to better patient care.
- Limitations to our study include not reviewing initial admission notes or discharge summaries, not assessing the change in the rate of medical errors associated with the change in the rate of copying and pasting and errors in the notes, and possible reviewers biased perception of the notes because of their awareness of the intervention, as can be anticipated with any non-randomized study.

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# Fewer Fatal Fractures: Impact of a Comprehensive Geriatric Hip Fracture Program on 1-Year Mortality

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# Disclosures

- None

# Introduction

- Hip fractures are a major health burden on the aging population in the U.S., with a 1-year mortality rate approaching 30%<sup>1</sup>
- However, geriatric hip fracture care has historically suffered fragmented care delivery

<sup>1</sup>Becker DJ, Arora T, Kilgore ML, et al. Trends in the utilization and outcomes of Medicare patients hospitalized for hip fracture, 2000-2008. *J Aging Health* 2014;26:360. DOI: 10.1177/0898264313516994.

# Introduction

- We implemented a comprehensive geriatric hip fracture program in October 2014; key interventions included:
  - Admission of all floor-status patients to the Orthopedics Service with hospitalist co-management
  - Geographic placement on the Orthopedics unit to ensure a cohesive interprofessional team
  - Standardized, evidence-based electronic order sets bundling geriatric and osteoporosis best practices and a streamlined workflow for discharge

# Introduction

- We previously reported short-term outcomes that included a 0.9-day reduction in hospital length of stay, a stable 30-day all-cause readmission rate, and improvements in osteoporosis management and outpatient follow-up<sup>2</sup>
- The aim of this study was to evaluate the impact of our comprehensive geriatric hip fracture program on 1-year mortality

<sup>2</sup>Anderson ME, McDevitt K, Cumbler E, Bennett H, Robison Z, Gomez B, Stoneback JW. Geriatric Hip Fracture Care: Fixing a Fragmented System. *Perm J.* 2017;21:16-104. DOI: <https://doi.org/10.1278/TPP/16-104>.

# Methods

- Our study population included patients aged 65 years and older admitted to our academic medical center with an acute fragility fracture between January 1, 2012 – March 31, 2016
- Mortality data were obtained for in-state residents from the Vital Statistics Program through the Colorado Department of Public Health and Environment
- Admissions for out-of-state residents or for a second hip fracture during the study period were excluded from the mortality analysis

# Results

- Pre- and post-intervention cohorts had similar baseline characteristics

	<b>Pre-Intervention Cohort<sup>a</sup></b>	<b>Post-Intervention Cohort<sup>b</sup></b>	<b>P Value</b>
	<b>(n = 135)</b>	<b>(n = 108)</b>	
Mean age, years (SD)	81.1 (9.1)	79.5 (7.9)	0.138
Women, No. (%)	95 (70.4)	67 (62.0)	0.175
Type of fracture, No. (%)			0.218
Femoral neck	62 (45.9)	61 (56.5)	
Intertrochanteric	66 (48.9)	42 (38.9)	
Subtrochanteric/other	7 (5.2)	5 (4.6)	
Mean ASA class (SD)	3.0 (0.6)	2.9 (0.6)	0.250
Mean Charlson Comorbidity Index (SD)	6.4 (2.5)	6.1 (2.3)	0.451
Mean time to surgery, hours (SD)	29.6 (26.2)	27.1 (17.9)	0.389

<sup>a</sup> January 1, 2012 - October 28, 2014

<sup>b</sup> October 29, 2014 - March 31, 2016

# Results

- Post-intervention cohort trended towards a lower 1-year mortality rate compared to the pre-intervention cohort

**Table 2. Unadjusted 1-Year Mortality for Geriatric Hip Fracture Patients**

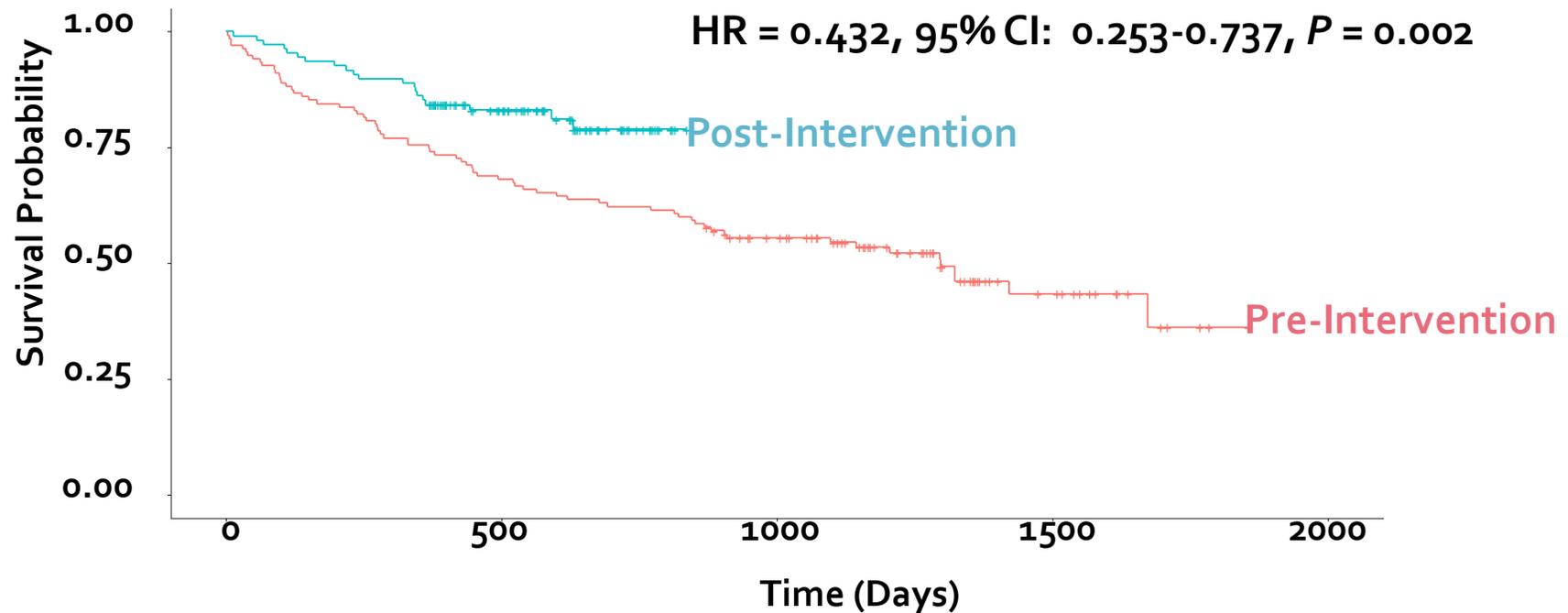
	Pre-Intervention Cohort <sup>a</sup> (n = 135)	Post-Intervention Cohort <sup>b</sup> (n = 108)	<i>P</i> Value
Mortality, No. (%)	33 (24.4)	17 (15.7)	0.111

<sup>a</sup> January 1, 2012 - October 28, 2014

<sup>b</sup> October 29, 2014 - March 31, 2016

# Results

- Post-intervention cohort had significantly higher overall survival than pre-intervention cohort



**Figure 1.** Overall survival for geriatric hip fracture patients. HR = Hazard ratio, adjusted for age, gender, type of fracture, ASA class, Charlson Comorbidity Index, and time to surgery.

# Conclusion

- Our comprehensive geriatric hip fracture program, which aimed to reduce fragmentation in care delivery, led to a trend towards improved 1-year mortality for geriatric hip fracture patients at our institution
- Such strategies aimed at reducing fragmentation in our health care system are essential for improving the quality, safety, and efficiency of care for our rapidly aging population in the U.S.

## Introduction

- There is a national opioid epidemic with substantial mortality exceeding deaths attributed to war and disease.
- National efforts take a strategic approach to managing chronic pain, including optimizing conservative modalities and avoiding combination usage of opioids and benzodiazepines due to increased risk of respiratory depression.
- Further compounding the opioid epidemic, patients with untreated mental illness tend to have co-occurring pain conditions.
- There is also increased utilization of the emergency department (ED) for patients with chronic pain.

## Results

- Using SPSS software, 44.2% patients with a co-morbid mental health condition had opioids prescribed as compared to 28.2% having a non-opioid prescription (p=0.007) (Table 1).
- The most common mental health conditions associated with opioid prescribing were depression (12.8%) and anxiety (8.6%).
- Patients taking psychotropic medications had a higher proportion of opioid prescriptions given in primary care (p=0.026).
- When comparing Outpatient (primary care) to the ED, there was a statistically significant difference among the four types of medications prescribed (Chart 1: either opioid, opioid + benzodiazepine (BZP) in combination, or non-opioid), with a  $\chi^2$  statistic of 51.85 (p<0.001).

After logistic regression adjusting for age, gender, & ethnicity:

- Patients with mental health conditions are **2.2 times more likely to have an opioid prescribed** than patients without mental health conditions (OR=2.15, p=0.019).
- Patients with mental health conditions are **3.1 times more likely to have a UDS checked** than patients without mental health conditions (OR=3.14, p=0.020).

## Conclusions

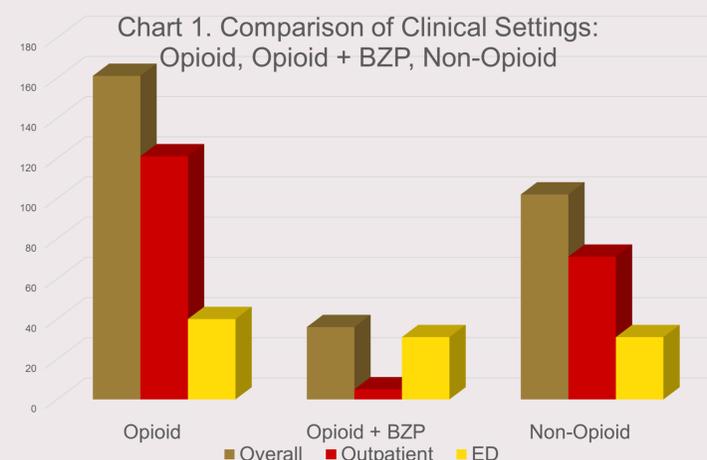
- ✓ There is a high proportion of opioids prescribed in both clinical settings, which is more prevalent in patients with co-morbid mental health conditions.
- ✓ There is also an association between the clinical setting and the type of prescribed medication. There was a higher prevalence of opioids prescribed in combination with benzodiazepines observed in the ED.
- ✓ This study highlights the need for enhanced recognition and management of mental health co-morbidity when managing chronic pain.
- ✓ Additionally, special attention should be paid to the occurrence of opioid and BZP co-prescribing, along with resource allocation in primary care to offset the strain of chronic pain patients seeking care in the ED.

**Table 1. Baseline Characteristics Comparing Opioid to Non-Opioid.**

Mental Health (MH) Conditions (%)	Overall (n=300)	Opioid (n=197)	Non-Opioid (n=103)	Z test	P-value
Generalized Anxiety disorder	7%	8.6%	3.9%	1.53	0.126
Bipolar Disorder	0.7%	1%	0%	1.03	0.305
Schizophrenia	1%	1%	1%	0.04	0.971
Post Traumatic Stress disorder	0.7%	1%	0%	1.03	0.305
Depression	11%	12.2%	8.7%	0.91	0.365
Other	2.7%	2%	3.9%	0.95	0.344
<b>Total % MH Condition</b>	<b>38.7%</b>	<b>44.2%</b>	<b>28.2%</b>	<b>2.70</b>	<b>0.007</b>
Psychotropic Medication	33.7%	38.1%	25.2%	2.23	0.026
Benzodiazepine	22.7%	28.4%	11.7%	3.30	<0.001

## Methods

- This is a cross-sectional, distinct secondary data analysis based on a study by Pierce DPR, *et al.* (in process, 2018) that extrapolated data from an electronic medical record (EMR) on prescriptions, monitoring and physical (and mental) health conditions in a variety of outpatient clinical settings, including primary care and the ED.
- A random sample of 300 medical records (patients with an ICD-10 musculoskeletal diagnosis) were reviewed during a 3-month timeframe in 2016 using a standardized abstraction tool.



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## Acknowledgements

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# The Effect of Reversal of Anticoagulation Preoperatively on 30-Day Mortality and Outcomes for Hip Fracture Repair: The RAP Hip Study

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## INTRODUCTION

- Over 300,000 people are hospitalized for hip fractures with greater than 20% mortality annually.
- Many patients undergoing hip fracture repair are on anticoagulation, which may delay surgery and increase the risk of complications.
- Our study aimed to examine the effect of anticoagulation reversal for hip fracture surgery on 30-day mortality and other clinical outcomes.

## METHODS

- All patients 60 years or older who sustained hip fractures, underwent surgical repair, and were on oral anticoagulation (warfarin or novel oral anticoagulants [NOACs]) at the time of diagnosis were enrolled in an 11-year (2006-2016) multicenter cohort study at Kaiser Permanente Northern California.
- Patients were assigned to cohorts based on treatment versus no treatment with reversal agents prior to surgery.
- Demographic and clinical variables including age, sex, ethnicity, Charlson comorbidity index (CCI), time-to-surgery, INR during hospitalization, oral anticoagulant type, and reversal agent choice were collected.
- The primary endpoint was 30-day mortality.
- Secondary endpoints included 30-day rates of delirium, venous thromboembolism (VTE), length of stay (LOS), readmission, and others.
- Statistical analyses included comparisons of demographic and clinical variables between the two groups and Cox proportional hazard models for hazard ratio (HR) and 95% confidence interval (CI) calculation.

**Table 1. Baseline Characteristics of Patients who Underwent Hip Fracture Surgery, 2006-2016.**

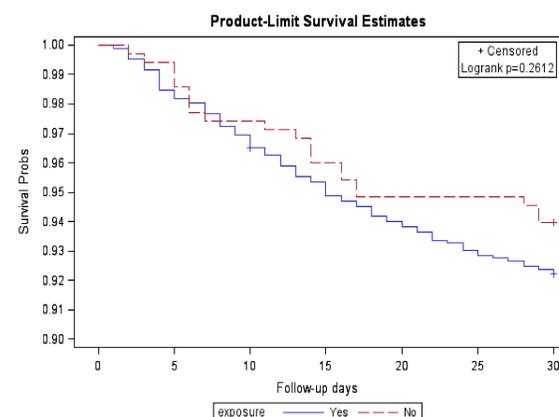
Demographic	Total (N=1 984) Mean (SD) or N (%)	Treatment (N=1 635) Mean (SD) or N (%)	No Treatment (N=349) Mean (SD) or N (%)	P-value
Age (years)	82.2 (7.3)	82.5 (7.2)	81.2 (7.6)	<0.05
Sex				<0.001
Female	1,233 (62.1)	986 (60.3)	247 (70.8)	
Male	751 (37.9)	649 (39.7)	102 (29.2)	
Race				<0.001
Hispanic	107 (5.4)	85 (5.2)	22 (6.3)	
Non-Hispanic White	1,747 (88.1)	1,460 (89.3)	287 (82.2)	
Non-Hispanic Black	56 (2.8)	42 (2.6)	14 (4.0)	
Non-Hispanic Asian	64 (3.2)	39 (2.4)	25 (7.2)	
Non-Hispanic Other	10 (0.5)	9 (0.6)	1 (0.3)	
Clinical				
INR at admission	2.5 (0.9)	2.6 (0.9)	2.0 (0.8)	<0.001
INR prior to surgery	2.0 (0.8)	2.0 (0.8)	1.8 (0.7)	<0.001
INR at discharge	1.7 (0.7)	1.7 (0.6)	1.9 (0.7)	<0.001
Time to surgery (hours)	45.3 (31.3)	47.1 (28.1)	37.0 (42.5)	<0.05
Charlson Comorbidity Index				<0.001
None	661 (33.3)	557 (34.1)	104 (29.8)	
1-2	465 (23.4)	354 (21.7)	111 (31.8)	
≥3	865 (43.3)	724 (44.3)	134 (38.4)	

**Table 2. Hazard Ratios for 30-Day Mortality.**

Variables	Unadjusted		Adjusted*	
	HR (95 CI)	P-value	HR (95 CI)	P-value
Reversal agents				
Yes	1.30 (0.82, 2.07)	0.26	1.00 (0.62, 1.60)	0.99
No	--		--	
Age <sup>a</sup>			1.83 (1.42, 2.36)	<0.001
Sex				
Male			1.60 (1.15, 2.21)	<0.05
Female			--	
CCI				<0.05
None			--	
1-2			0.87 (0.52, 1.45)	
≥3			1.74 (1.19, 2.55)	

\*Adjusted for reversal agents, age, sex, race, CCI, and INR at admission.  
<sup>a</sup>10-year as a unit

**Figure 1. Kaplan-Meier Estimates of Survival in the Two Groups.**



## RESULTS

- 1,635 patients (82.4%) who received treatment with reversal agents and 349 patients (17.6%) who received no treatment were enrolled (N=1,984).
- Most patients were on warfarin compared to NOACs (98.9% versus 2.1%).
- Patients treated were more likely to be white and male, have higher CCI, higher INR at admission and prior to surgery, and lower INR at discharge (all p<0.001).
- Among patients treated, 7.8% died within 30 days compared to 6% among untreated patients; no significant association was detected between anticoagulation reversal and mortality for both bivariate analysis (HR 1.30, 95 CI [0.82-2.07]) and analysis adjusting for age, sex, ethnicity, CCI, and INR at admission (HR 1.00, 95 CI [0.62-1.60]).
- Older age, male sex, and higher CCI were significantly associated with mortality.
- For secondary endpoints, treatment was associated with higher rates of delirium (OR 1.84, 95 CI [1.10-3.09]) and mean LOS (6.4 versus 5.7 days, p=0.047), while the effect was no longer significant for either outcome after adjusting for demographic and/or clinical variables. No significant associations were detected between anticoagulation reversal and 30-day rates of acute myocardial infarction, transient ischemic attack/stroke, venous thromboembolism, major bleeding, or all-cause readmission.

## DISCUSSION

- We did not find significant associations between anticoagulation reversal for hip fracture surgery and 30-day mortality or other outcomes.
- However, we observed clinically significant differences in patients selected to receive treatment.
- Additionally, though non-significant, the reversal group had higher rates of adverse outcomes.
- Further studies are needed to investigate provider variation in patient selection for treatment and to determine the effect of reversal on outcomes in a randomized controlled trial.

# Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio as Predictive Markers for Deep Vein Thrombosis

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# INTRODUCTION

- DVT is thought to be an inflammatory process. Multiple inflammatory biomarkers were found to predict development of DVT including IL-6, IL-8, soluble platelet selectin, monocyte chemotactic protein 1, TNF alpha and C-reactive protein.
- Studies have shown a correlation between elevated Neutrophil to lymphocyte ratio (NLR) and platelets to lymphocyte ratio (PLR) in systemic inflammation
- NLR and PLR are emerging markers and have been (and currently are) being implemented in multiple diseases that are pro-inflammatory.



# The values of neutrophil to lymphocyte ratio and platelet to lymphocyte ratio in predicting 30 day mortality in patients with acute pulmonary embolism

Yaqing Ma, Yimin Mao\*, Xuegai He, Yuxia Sun, Shenshen Huang and Jiayong Qiu

## Abstract

**Background:** Acute pulmonary embolism (PE) is a life threatening disease. The treatment options depend on the severity of the disease and the mortality varies widely depending on the severity of the condition. It is important to identify patients who are at high risk of mortality. The aim of the present study was to explore the prognostic values of neutrophil to lymphocyte ratio (NLR) and platelet to lymphocyte ratio (PLR) for 30-day mortality in patients with acute PE.

**Methods:** The study included 321 patients admitted to our university hospital between January 2013 and May 2015 with the diagnosis of acute PE. Multivariable risk models were developed to assess the predictive values of the NLR and PLR for 30-day mortality. Discrimination was evaluated using receiver operating characteristic (ROC) curves.

**Results:** Two hundred forty-eight patients met our selection criteria. Twenty of them died within 30 days of hospital admission. NLR was found to be an independent predictor after other confounding factors were adjusted in the model. For 1 unit of increase of NLR, the risk of 30-day mortality rose about 13 % (OR = 1.13, 95 % CI: 1.04–1.23). The area under ROC for NLR is 0.79 (95 % CI: 0.703–0.880). PLR was associated with 30-day mortality in univariate analysis but the predictive ability diminished with inclusion of other predictors in multivariable model.

**Conclusions:** NLR is readily available predictor for short-term mortality. It could be a useful indicator for identifying high risk population and guiding clinical management of acute PE.

**Keywords:** Pulmonary embolism, Neutrophil, Lymphocyte

# METHODS

- Patients presenting to SJHMC between 2010-2014 with
  - lower extremity swelling
  - lower extremity ultrasound Doppler
  - complete blood count drawn on day of LE US Doppler
  - D-Dimer level checked

# METHODS – EXCLUSION CRITERIA

- Those patients will be excluded from this study because we are looking for primary elevation of NLR and PLR rather than secondary causes:
  - Malignancy on chemotherapy
  - Rheumatic diseases
  - Inflammatory bowel diseases
  - Chronic renal disease
  - Chronic liver disease
  - Pregnancy/ Delivery
  - Recent surgeries
  - Patients currently being treated for infectious diseases
  - patients with inherited thrombophilia

# METHODS – ANALYSIS OF BLOOD SAMPLE

- Total neutrophil, lymphocyte and platelet counts should be measured from a complete blood count (CBC) sample that was taken within 24 hours of the lower extremity venous duplex study.
- The NLR will be calculated by dividing the total neutrophil count by lymphocyte count.
- The PLR will be obtained by dividing the total count of platelets by lymphocyte count.

# METHODS – CUT-OFF VALUES

- In a study conducted by Bakirci et al.,
  - NLR  $\geq 3.4$  had higher risk for a pro-inflammatory event than those with lower NLR (*p-value*  $<0.001$ )
- In another study conducted by Ferroni et al.
  - PLR  $\geq 230$  had higher risk for pro-inflammatory event than those with lower PLR (*p-value*  $<0.001$ )
- A positive D-Dimer level is a level equal to or above 500 ng/ml whereas a negative D-Dimer level is defined as below 500 ng/ml.
- To look at tests in parallel, an additional categorization was made that compared patients who were positive on both NLR and PLR (D-POS)

# RESULTS – DATA COLLECTION

Patients presenting to SJHMC between 2010-2014  
with LE swelling  
N = 708

US LE Doppler Positive  
D-Dimer and CBC checked same day of US  
N = 202

US LE Doppler Negative  
D-Dimer and CBC checked same day of US  
N = 506

Meet exclusion criteria

DVT Group  
N=51

Control Group  
N=51

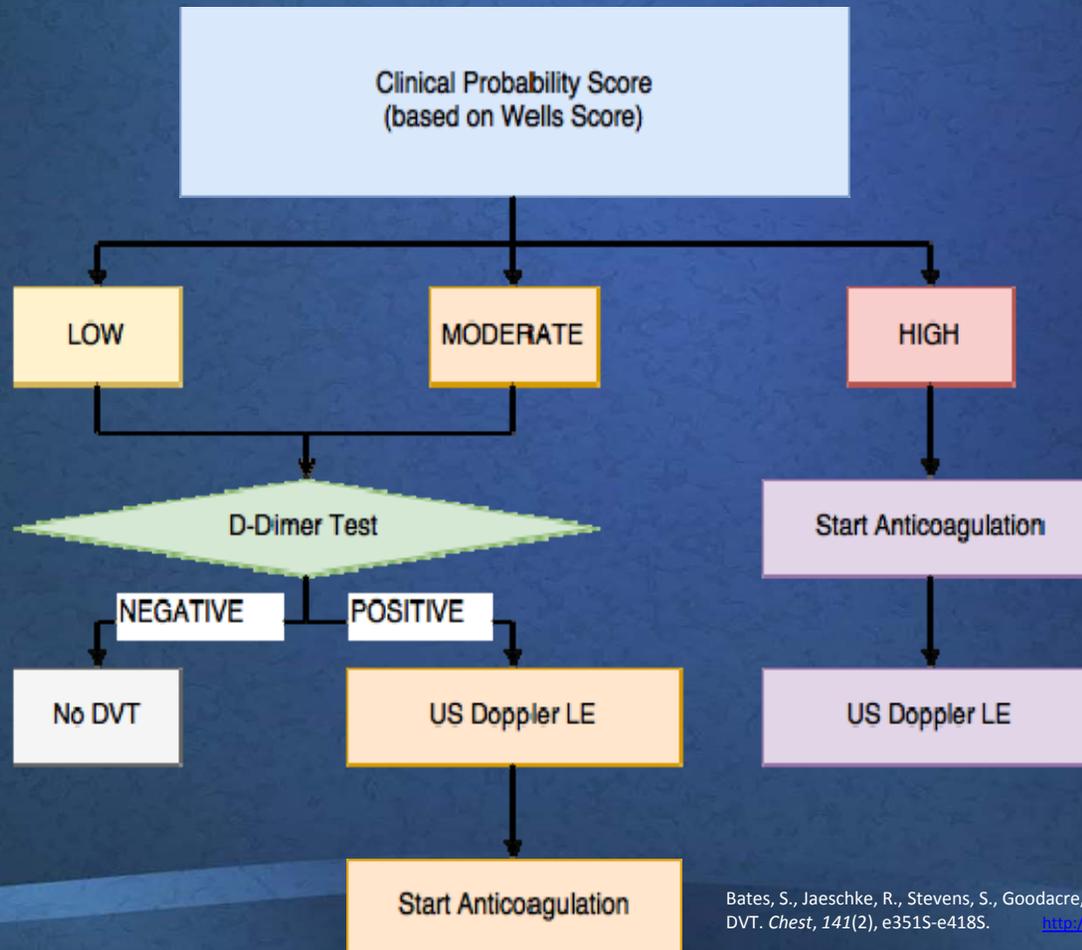
# RESULTS – DATA COLLECTION

		DVT group	Control Group	<i>p-value</i>
AGE		60.5 ± 20.4	60.3 ± 18.7	0.96
GENDER	MALE	52.9%	41.2%	0.687
	FEMALE	47.1%	58.8%	
RACE	BLACK	56.9%	60.8%	0.234
	WHITE	43.1%	39.2%	
NLR	POSITIVE	90.2%	19.6%	<b>&lt;0.0001*</b>
	NEGATIVE	9.8%	80.4%	
PLR	POSITIVE	62.7%	2.0%	<b>&lt;0.0001*</b>
	NEGATIVE	37.3%	98.0%	
D-POS	POSITIVE	88.6%	0.0%	<b>&lt;0.0001*</b>
	NEGATIVE	11.4%	100.0%	
D-Dimer	POSITIVE	88.2%	64.7%	<b>0.005*</b>
	NEGATIVE	11.8%	35.3%	

# RESULTS

	Sensitivity	Specificity	PPV	NPV
NLR	90.2%	80.4%	82.1%	89.1%
PLR	62.7%	98.0%	97.0%	72.5%
D-POS	88.6%	100.0%	100.0%	90.9%
D-Dimer	88.2%	35.3%	57.7%	75.0%

# DISCUSSION – ALGORITHM TO DIAGNOSE DVT BASED ON WELL'S SCORE AND D-DIMER



Bates, S., Jaeschke, R., Stevens, S., Goodacre, S., Wells, P., & Stevenson, M. et al. (2012). Diagnosis of DVT. *Chest*, 141(2), e351S-e418S. <http://dx.doi.org/10.1378/chest.11-2299>

# DISCUSSION – WELL'S SCORE

- In 1995 a study done by Dr. Philip S. Wells validated a scoring system called the Wells score.
- Based on this study the authors reported that at its best (high risk patients), the Wells score had a sensitivity of 78%, specificity of 98%, PPV 91% and NPV 98%.
- However, a study done to check the accuracy and safety of the pretest probability assessment of deep vein thrombosis by physicians in training using the Wells score found that the scoring was subjective; Different physicians tend to stratify the same patients in different risk categories.

If Present	Score
Active cancer (treatment on going or within previous 6 months or palliative)	1
Paralysis, paresis, or recent plaster immobilization of the lower extremities	1
Recently bedridden >3 days or major surgery within 12 weeks requiring general or regional anesthesia	1
Localized tenderness along the distribution of the deep venous system	1
Entire leg swollen	1
Calf swelling 3 cm > asymptomatic side (measured 10 cm below tibial tuberosity)	1
Pitting edema confined to the symptomatic leg	1
Collateral superficial veins (non-varicose)	1
Alternative diagnosis as, or more likely than DVT	-2

legend NOTE: In patients with symptoms in both legs, the more symptomatic leg is used.

legend Pre-test probability calculated as follows:

legend Total Points

legend High  $\square$  3

legend Moderate 1 or 2

legend Low  $\square$  0

Wells, P., Hirsh, J., Anderson, D., Lensing, A., Foster, G., & Kearon, C. et al. (1995). Accuracy of clinical assessment of deep-vein thrombosis. *The Lancet*, 345(8961), 1326-1330. [http://dx.doi.org/10.1016/S0140-6736\(95\)92535-2](http://dx.doi.org/10.1016/S0140-6736(95)92535-2)

Penaloza, A., Laureys, M., Wautrecht, J., Lheureux, P., & Motte, S. (2006). Accuracy and safety of pretest probability assessment of deep vein thrombosis by physicians in training using the explicit Wells clinical model. *J Thromb Haemost*, 4(1), 278-281. <http://dx.doi.org/10.1111/j.1538-7836.2005.01790.x>

# DISCUSSION – D-DIMER

D-dimer assay	Sensitivity, % (95% CI)	Specificity, % (95% CI)	Negative PV, % (95% CI)	Positive PV, % (95% CI)	Assay method	Test turnaround time, <i>min</i>
Qualitative Methods						
Minutex	80 (66–90)	90 (78–97)	81 (68–91)	89 (76–96)	LA	3
SimpliRED	80 (66–90)	94 (83–99)	82 (70–91)	93 (81–99)	Whole blood agglutination	2
Instant IA	94 (83–99)	63 (48–77)	91 (76–98)	72 (60–83)	ELISA immunofiltration	
Semi-quantitative methods						
NycoCard	98 (98–100)	31 (18–46)	94 (69–100)	59 (48–70)	ELISA immunofiltration	4
BC-DD	77 (62–88)	91 (79–98)	79 (65–89)	90 (76–97)	Automated LA	3
Turbiquant	89 (77–97)	60 (44–74)	84 (67–95)	70 (57–81)	Automated LA	3
IL-DD	90 (78–97)	78 (63–88)	88 (75–96)	80 (67–90)	Immunoturbimetric LA	7
Liatest	96 (86–100)	47 (32–62)	92 (74–99)	65 (53–76)	Immunoturbimetric LA	7
Tinaquant	100 (93–100)	39 (25–54)	100 (82–100)	63 (51–73)	Immunoturbimetric LA	15
VIDAS	100 (93–100)	41 (27–56)	100 (83–100)	63 (52–74)	Fluorescence ELISA	35
Asserachrom	98 (88–100)	42 (28–58)	95 (75–100)	64 (52–75)	ELISA	120
Enzygost	94 (82–99)	62 (46–76)	90 (74–98)	72 (59–83)	ELISA	120
Fibrinostika	100 (92–100)	36 (22–51)	100 (79–100)	62 (50–73)	ELISA	120

Van der Graaf, F., Van den Borne, H., & Van der Kolk, M. (2000). Exclusion of deep vein thrombosis with D-dimer testing: comparison of 13 D-dimer methods in 99 outpatients suspected of deep venous thrombosis using venography as reference standard. *Thromb Haemost*, (83), 191-198.

## DISCUSSION - COSTS

- Based on *clearhealthcosts.com* (a non-profit organization that bring transparency to the health-care market place by telling people the amount different hospitals charge for medical procedures and items):
- On Average a D-Dimer test cost \$230.92.
  - The blood sample need to be drawn in a separate tube than routine blood work such as complete blood count.
  - Multiple specific reagents must be added for the detection of D-Dimer which make it labor intensive.
  - D-Dimer quantification uses a specific machine that may not always be readily available.
- On the other hand, on average a CBC with differential cost \$16.00. The NLR and PLR can be calculated directly from it at no additional cost.

## DISCUSSION

- Based on this study, both NLR and PLR are better predictors of the presence or absence of DVT compared to D-Dimer.
- NLR can be useful to rule-out DVT when it is negative; whereas PLR can be useful in ruling-in DVT when it is positive.
- Furthermore, a positive NLR and positive PLR yielded the best diagnostic value for predicting DVT.
- Although we managed to compare NLR and PLR against D-Dimer. However, we were unable to do it in conjunction with the Wells score, since it was only reported in a handful of patients. Those ratios should be checked prospectively along with D-Dimer and Wells score to be validated for clinical practice.

# CONCLUSION

**NLR and PLR ratios offer a new powerful, affordable, simple and readily available tool in the hands of clinicians to help them in the diagnosis of DVT.**

Thank you!



# Use of a Case-Based Conference Series on High-Value Care in an Internal Medicine Training Program

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## BACKGROUND

- Health care costs in the United States have risen dramatically over the last several decades, with total expenditures projected to reach \$4.6 trillion by 2020; this increase in spending is unsustainable.
- An estimated 30% of health care spending is thought to be related to overuse or misuse of health care resources at the provider level, resulting in excess waste.
- Resident training programs have a responsibility to educate their trainees on the concept of **high-value care**, prompting a recent initiative by the ACP aimed at this goal.
- The objectives of this study were to:
  - Raise awareness among residents about high-value care in everyday clinical practice.
  - Provide an open forum for discussion on topics related to high-value care.
  - Practice decision-making centered on high-value care themes.

## METHODS



- 11 residents were enrolled in a medical education elective between 2015-17.
- As part of the elective, each resident received formal training on high-value care, curriculum development, case-based learning, and facilitation of small group discussions.
- Each resident enrolled in the elective was responsible for developing and leading a case-based conference centered on the theme of high-value care.
- Each conference lasted 30 minutes and was composed of a case presentation, a small group discussion, and a short segment of didactics, often accompanied by additional learning resources such as slides or handouts.
- A total of 11 case conferences were held between February 2016 and March 2017.
- Each case conference was evaluated by participants using a standardized survey.

## RESULTS

- Average attendance for each case conference was 11 (range 7-14). Participants included internal medicine residents (92%) and attendings (8%).
- Ninety-eight percent of residents agreed or strongly agreed that these conferences taught them new important information and/or verified important information.
- Eighty-eight percent of residents agreed or strongly agreed that these conferences were likely to change their practice.
- Residents reported that they were likely or very likely to share the information with medical students (96%), residents (94%), attendings (72%), and patients (88%).
- Residents reported that the teaching cases were either moderately or extremely relevant (98%), realistic (99%), and instructional (98%).
- Overall impression of the conferences was rated as very good or excellent by 98% of residents.

Level	Percentage of residents
Strongly Agree	60%
Agree	38%
Neutral	2%
Disagree	0%
Strongly disagree	0%

**Table 1.** Resident responses to prompt: "This session taught me new information and/or verified important information."

Level	Percentage of residents
Strongly Agree	50%
Agree	37%
Neutral	11%
Disagree	1%
Strongly disagree	0%

**Table 2.** Resident responses to prompt: "The information learned during this session is likely to change my practice."

	Percentage of residents responding "Likely or Very Likely"
Medical Students?	96%
Residents?	94%
Attendings?	72%
Your Patients?	88%

**Table 3.** Resident responses to prompt: "How likely are you to share or teach the value-based principles learned in this session to..."

	Percentage of residents responding "Very Good or Excellent"
Session facilitator	99%
Teaching case	97%
Session as a whole	98%

**Table 4.** Resident responses to prompt: "Overall impression of..."

## DISCUSSION

- The majority of residents in our study agreed that the information garnered from these conferences was likely to change their clinical practice.
- The use of a formal curriculum dedicated to high-value care in resident education programs may translate into more widespread practice of high-value care among future attending physicians.
- Case-based teaching has been found to be more effective than traditional lecture-based teaching, especially in the context of improving critical thinking and decision-making skills among trainees.
- These results suggest that case-based learning may be an especially effective framework in which to train residents on the topic of high-value care.
- Limitations of this study include the small sample size and subjective measures of efficacy.
- Further study is needed to elucidate the best way to incorporate high-value care into residency curricula and the impact of such curricula on actual clinical practice and patient outcomes.
- The results are nonetheless encouraging for the use of a case-based learning framework to increase residents' exposure to high-value care during their training.

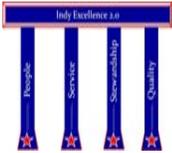
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# Not Utilizing Lean? Your LOS(S): A Two Year Retrospective on Lean management and Length of Stay (LOS)

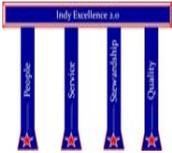


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## Disclosures

The authors do not have any conflicts of interest to report

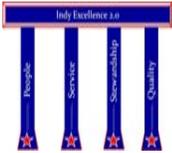


# Introduction

- Toyota Production System (TPS), also known as Lean, has been employed as a process improvement methodology by healthcare organizations with variable success<sup>1</sup> At its heart, TPS aims to maximize value for the 'customer' by seeking out and eliminating waste from the system<sup>2</sup>.
- Syracuse VA Medical Center (SVAMC), a 116-bed teaching hospital in Upstate New York, has effectively used TPS methodologies to bring down its mean **length of stay (LOS) from 6.6 days in FY15 to 4.7 days in FY17**
- SVAMC has sustained its reduction in LOS, receiving national recognition from the Veterans Health Administration in the process

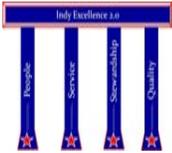
1. John Moraros, Mark Lemstra, Chijioke Nwankwo; Lean interventions in healthcare: do they actually work? A systematic literature review, *International Journal for Quality in Health Care*, Volume 28, Issue 2, 1 April 2016, Pages 150–165, <https://doi.org/10.1093/intqhc/mzv123>

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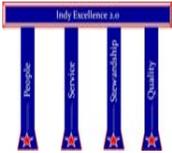
## Methods (1 of 3)

- Faced with an increasing length of stay of over seven days, along with an ER diversion rate in the bottom 5 % of the country, SVAMC set out to revamp its inpatient flow in September 2015
- An 'Inpatient Value Stream' Committee was chartered to identify focus areas that might adversely affect LOS. Areas that were selected include but were not limited to: discharges to home, telemetry utilization, discharges to skilled nursing facilities (SNF) and transfer to outside hospitals.



## Methods (2 of 3)

- A series of 'Rapid Process Improvement Workshops,' or RPIWs were conducted over a period of 18 months
- Clinical staff were freed up from their clinical duties for 3-5 days (depending on project scope) to critically appraise processes, identify wasteful practices, and to develop new & improved processes in collaboration with frontline staff
- The output of the RPIWs, dubbed standard work, captures the new process in an easy to follow, step-by-step document. In some cases, the standard work is embedded in to the electronic medical record (EMR), effectively forcing the function and ensuring 100% compliance with the new process.



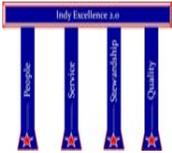
## Methods (3 of 3)

- In addition, standard work audits were conducted periodically by mid-level managers:
  - To ensure that the new process was being followed
  - To determine if revisions needed to be made to the standard work, so that it accurately captured the best way to perform a process
- Other factors that likely contributes to the success of the RPIW's include leadership involvement, structured accountability and improved inter-disciplinary communication as a result of working together on projects.



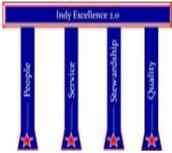
# Example of Standard Work

STEP	WHO	ICON	PROCESS	TIME
			<b>CODE ROUNDING</b> Critical patients first Observation status patients Discharges Everyone else	
1	Intern		Ask patient/family member about mode of transportation one day prior to discharge	2 min
2	Intern		Document mode of transportation in progress note one day prior to discharge	2 min
3	Intern		Place anticipated discharge 1 day prior to d/c (if appropriate)	2 min
4	Intern		Submit Social Work consult ASAP if he/she needs a ride beyond Syracuse and its suburbs	3 min
5	Inpatient team		Discharge timeout on day of discharge to assess for oxygen, Foley catheter needs, medication, IV lines, pending lines	5 min
6	Inpatient team		Complete medicine reconciliation during rounds with the inpatient pharmacist if available. <ul style="list-style-type: none"> <li>order any new medications on the outpatient tab</li> <li>make necessary changes to the existing outpatient medications</li> </ul>	5 min
7	Intern		Complete discharge instructions with relevant information on diet, wound care, etc.	5 min
8	Intern		Complete and signed the discharge summary if required by the receiving facility	10-20 min
9	Intern		Place the discharge order, including all relevant follow-up clinic appointments <b>PRIOR TO NOON CONFERENCE (if unable to do so, please handoff the discharge to the attending physician).</b>	2 min

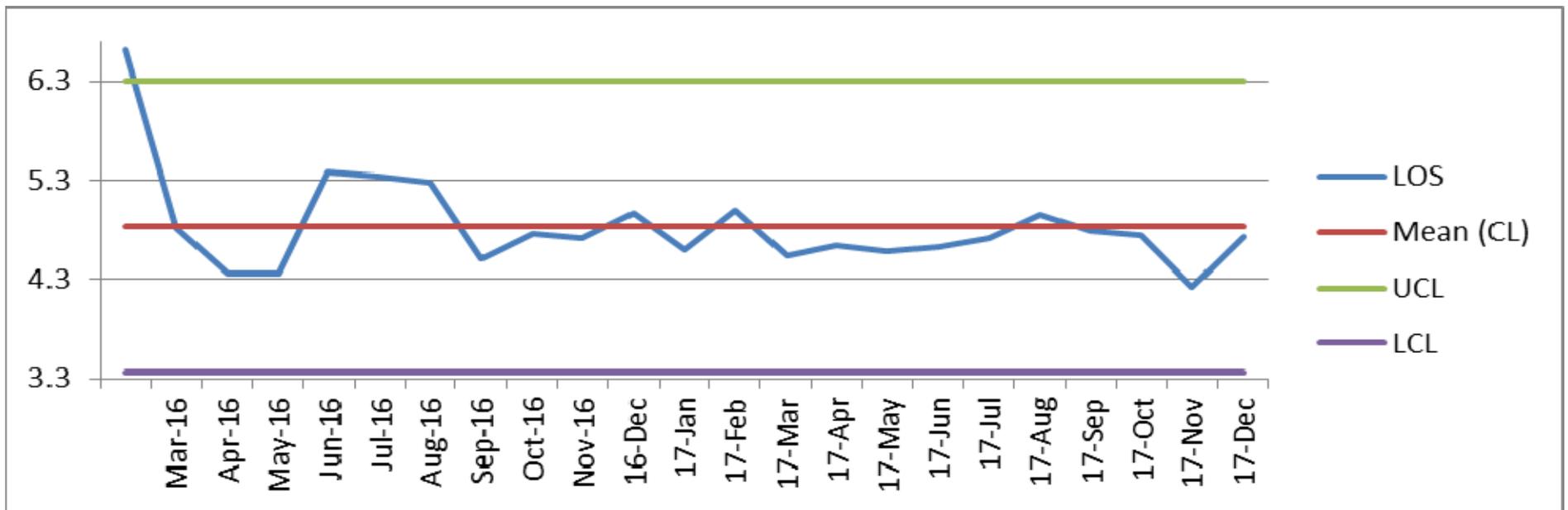


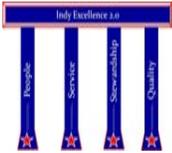
## Results

- A significant reduction in LOS at SVAMC was realized within a few months of initiating TPS methodologies (see XmR control chart on slide 8)
- Arguably, the process improvement with the biggest impact was standardizing placement of veterans to SNF, which resulted in reducing LOS for such patients from 7 days to 2.7 days.
- Other notable improvements were reduction in readmission rate from 18.3% to 13.6%, increased annual bed turns from 64.8 to 69.8, and increased patient satisfaction scores from 64.3% to 74.7%



## Length of Stay XmR control chart in days (desired direction: ↓)





## Conclusion

Lean can be adopted successfully into a healthcare setting- provided there is leadership buy-in, perseverance with standard work and meaningful celebration of the small wins



# Examining Practice Patterns: Are we admitting too many patients for uncomplicated alcohol withdrawal?

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<sup>1</sup> Uniformed Services University <sup>2</sup> Naval Hospital Jacksonville <sup>3</sup> Naval Medical Center Portsmouth (NMCP)

## BACKGROUND

- Prevalence of alcohol abuse and dependence in the US ranges between 7-16% and is estimated 15-20% in the military<sup>1,2</sup>
- TRICARE beneficiaries cost the DoD \$1.12 billion in 2006 and \$425 million are spent annually for active duty military members being treated for alcohol management<sup>3</sup>
- Alcohol withdrawal syndrome (AWS) occurs following a reduction in alcohol use; symptoms include anxiety, asterixis, diaphoresis, tachycardia, and fever
- AWS can progress to life threatening delirium tremens (DTs) and ultimately seizures; therefore, identifying these high risk patients is paramount as they require close inpatient monitoring
- Identification of high risk patients is complicated and many parameters are available to a physician to identify those at highest risk

## PURPOSE

- Examine the local practice patterns for management of patients presenting to the Emergency Department (ED) for AWS
- Develop a triage protocol for use in the ED
- Retrospectively apply this protocol to examine its potential impact on our local practice patterns

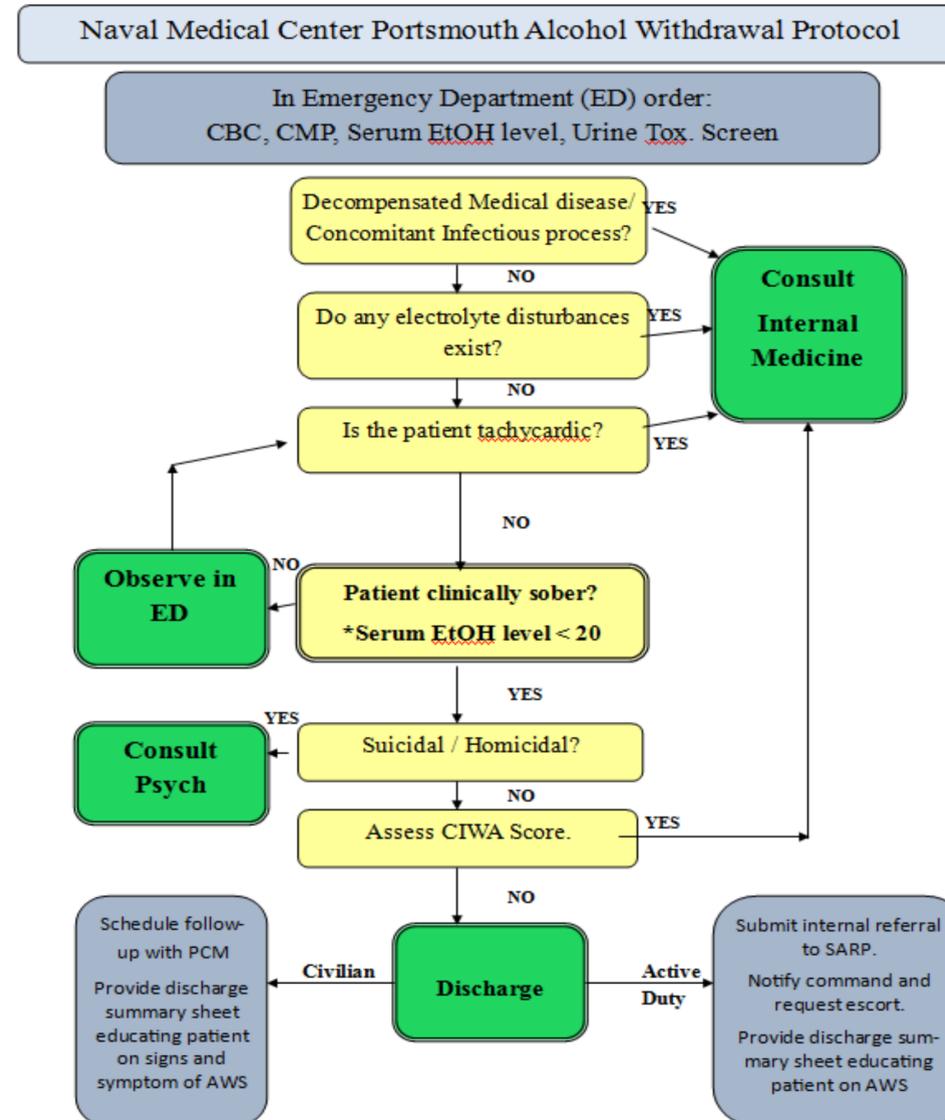
## PATIENT SELECTION

- 658 patients were admitted to NMCP from 'Aug 15 to Aug 16' for alcohol withdrawal, intoxication/detoxification
- 151 of the 658 patients were admitted to the General Internal Medicine (GIM) service and met inclusion criteria for the study

## REFERENCES

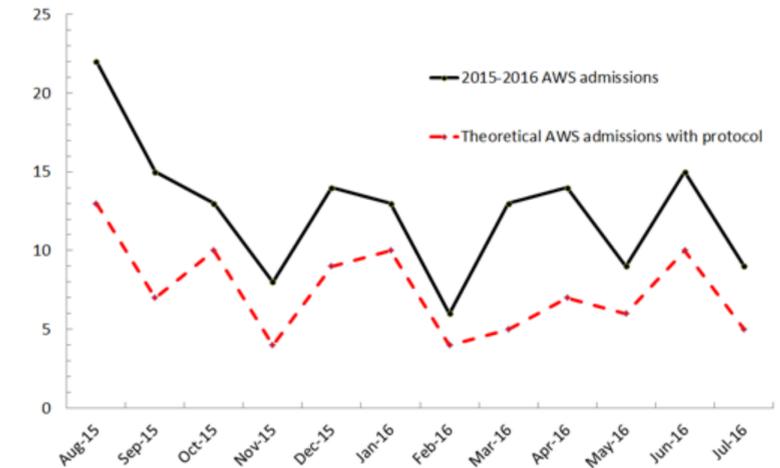
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## PROTOCOL DEVELOPMENT 4-10



## RESULTS & DISCUSSION

Potential Reduction in Monthly Admission Rates



- 11 of 151 patients developed DTs while admitted
- 1 of 11 patients developed seizure while admitted
- Our protocol captured ALL patients that developed DTs/seizure and triaged them for admission to NMCP had the protocol had been in effect
- Potential reduction of inpatient operating costs:  
If the protocol had been in effect  
Admissions reduction: 61 per year  
Average length of stay: 2 days  
Cost of a GIM bed: ~\$7,500 per day  
Reduction of nearly \$900,000 / year for inpatient services

## NEXT STEPS

- Barriers to overcome include:
  - Changing personal habits and beliefs in the ED
  - Overcoming safety and operational concerns
  - Interacting with command DAPAs to facilitate outpatient rehabilitation for service-members
- Protocol to be implemented at NMCP ED
- Prospective study planned to determine the actual year over year reduction in admissions for AWS after implementation

The views expressed in this poster are those of the author and do not necessarily reflect the official policy or position of the Department of the Navy, Department of Defense or the U.S. Government.



# FAST TRACK DIALYSIS: IMPROVING EMERGENCY DEPARTMENT AND HOSPITAL THROUGHPUT FOR PATIENTS REQUIRING HEMODIALYSIS

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## Background

Many end stage renal disease (ESRD) patients present with complaints related to missed or incomplete hemodialysis (HD). Inpatient HD units often are not credentialed for outpatient use which results in extra cost and consumes additional resources for a standard outpatient procedure. Delays in patient throughput in emergency departments (ED) can cause boarding in the ED which can lead to poor outcomes and decreased patient satisfaction. Hospital admission for missed HD can lead to longer stays than what is medically required.

## Methods

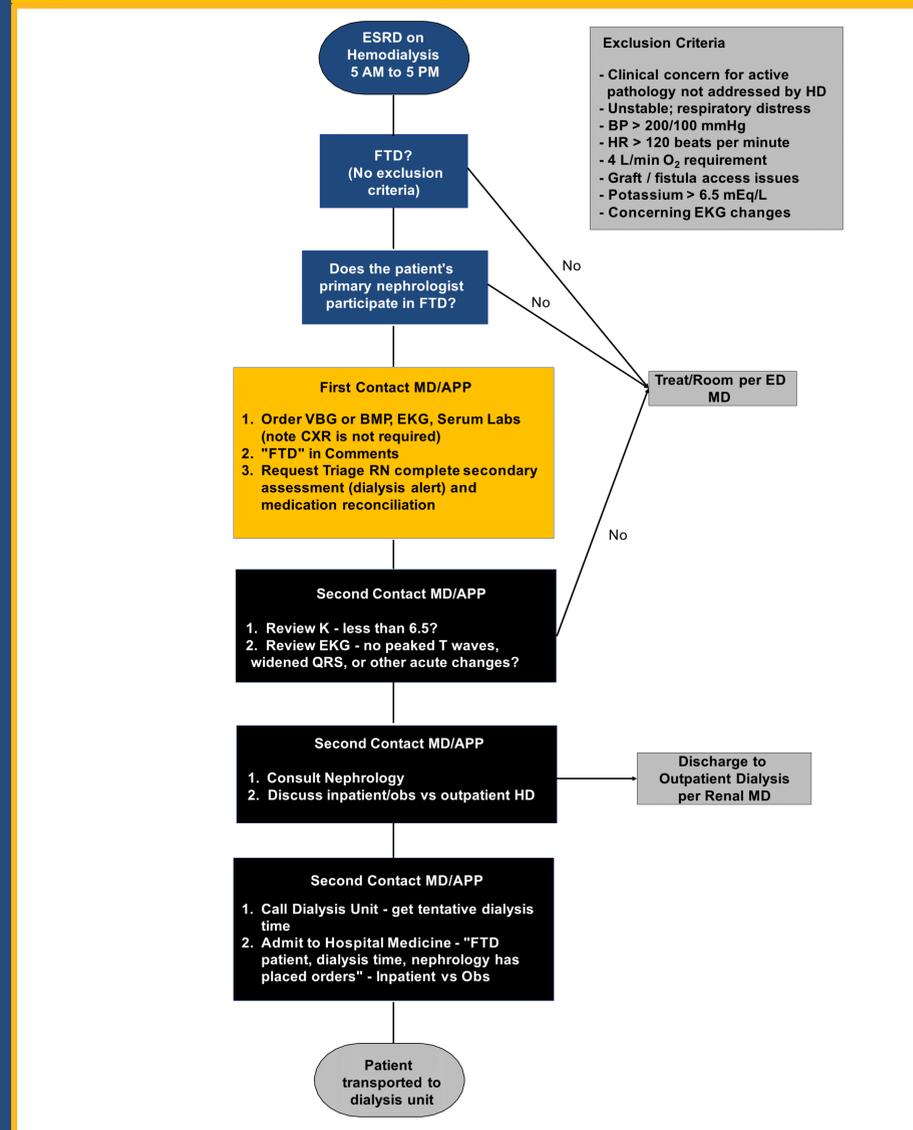
A multidisciplinary team created a unique triage pathway, Fast Track Dialysis (FTD), to improve the flow of ESRD patients presenting to the ED for missed HD.

The FTD pathway rapidly identified low risk ESRD patients presenting with an urgent need for HD. FTD care was facilitated with standardized communication between Emergency Medicine (EM), Nephrology, Hospital Medicine and Nursing. The FTD pathway emphasized the option to use venous blood gases for measuring potassium levels and limited telemetry, chest X-ray, and peripheral intravenous lines when not clinically indicated.

Patients eligible for FTD were identified by ED providers. Exclusion criteria included clinical concern for illness that would require admission beyond one session of HD, arteriovenous graft or fistula issues requiring surgical or interventional radiology intervention, blood pressure greater than 200/100 mmHg, heart rate greater than 120 beats per minute, hypoxia requiring greater than 4 liters of supplemental oxygen per minute, potassium greater than 6.5 mEq/L, and the presence of concerning electrocardiogram abnormalities.

A six-month historical control group was compared with a six-week FTD cohort. The historical group was filtered by admitting diagnosis (ICD-10 codes consistent with conditions that dialysis addresses), anticipated length of stay of less than 48 hours, and the exclusion criteria listed above.

## Figure 1. FTD Flow Pathway



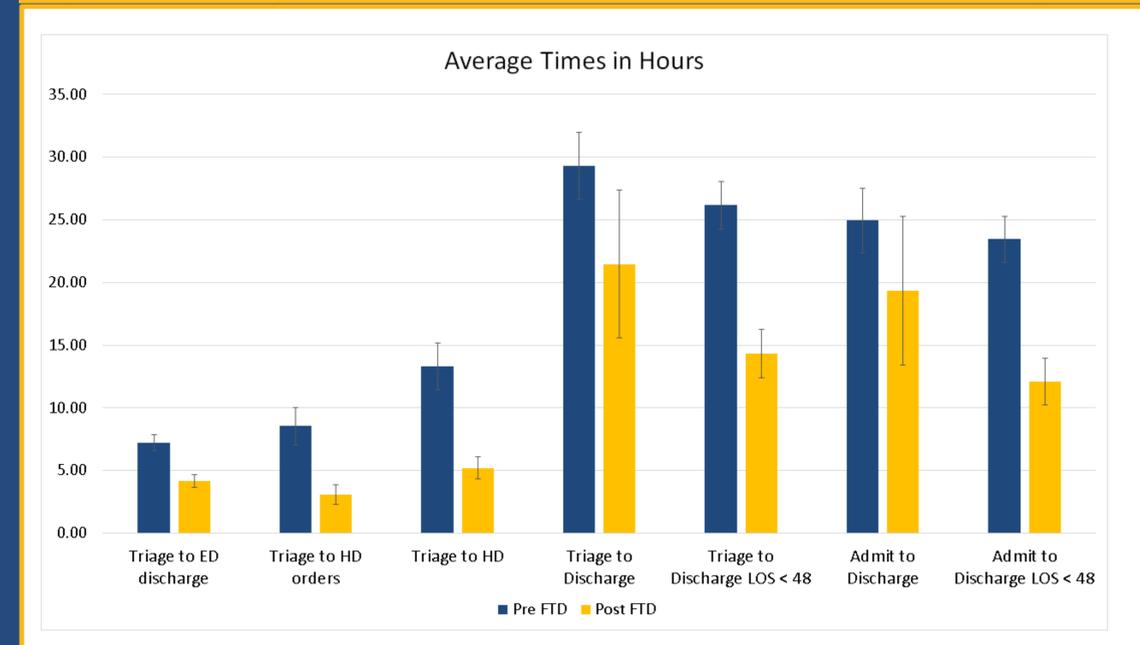
## Results

FTD led to a significant reduction in most measures studied. Time from triage to ED discharge was reduced by more than 3 hours. Time from triage to placement of HD orders decreased by more than 5 hours. Time from triage to hospital discharge was reduced by nearly 12 hours when excluding outliers who stayed greater than 48 hours.

## Table 1. Pre and Post Intervention Times

	Pre FTD (n=82) (1/1/17-6/30/17)		Post FTD (n=76) (9/25/17-3/16/18)		p-value
	Hrs	95% CI	Hrs	95% CI	
Triage to ED Discharge	7.23	6.59 - 7.87	4.16	3.21 - 5.12	<0.01
Triage to HD orders	8.54	7.06 - 10.01	3.06	1.62 - 4.50	<0.01
Triage to HD	13.30	11.45 - 15.15	5.19	3.52 - 6.86	<0.01
Triage to Discharge	29.33	26.64 - 32.01	21.46	10.28 - 32.64	0.01
Triage to Discharge LOS < 48hrs	26.16	24.28 - 28.05	14.33	10.72 - 17.95	<0.01
Admit to Discharge	24.94	22.38 - 27.51	19.35	8.11 - 30.58	0.17
Admit to Discharge LOS < 48hrs	23.44	21.60 - 25.28	12.07	8.57 - 15.58	<0.01

## Figure 2. Average Time (Hrs) for Patient Flow Prior to and During FTD



## Conclusions

The implementation of a novel patient care pathway intended to identify, triage, and facilitate the care of low risk ESRD patients who require urgent HD led to a reduction in resource utilization in an urban community and academic hospital.

## Affiliations

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# **A STUDY ON THE NATURE OF ADMISSIONS TO ACCIDENT AND EMERGENCY DEPARTMENT IN A TERTIARY CARE HOSPITAL IN SRI LANKA**

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# INTRODUCTION

- The new healthcare reform policies of our country include development of Accident and Emergency (A&E) Departments in all major hospitals . Department of Teaching Hospital Kurunegala (THK) is the first established A&E Department in Sri Lanka. This 14 bedded unit, with a staff of 42 nurses and 39 doctors, headed by an acute care specialist, provides 24 hour services daily to a 2.4 million population in the North-Western province and a part of Sabaragamuwa province. This study was carried out to identify the nature of all the admissions to A&E department of THK.

# OBJECTIVE

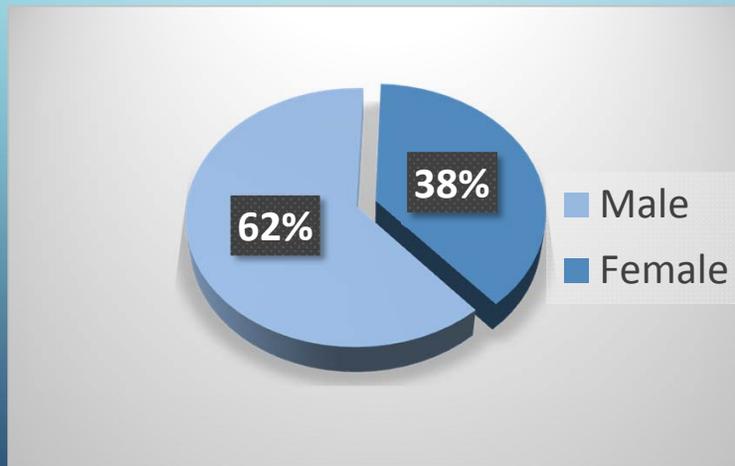
- To identify nature of all the admissions to A&E at Teaching Hospital Kurunegala, Sri Lanka.

# METHODS

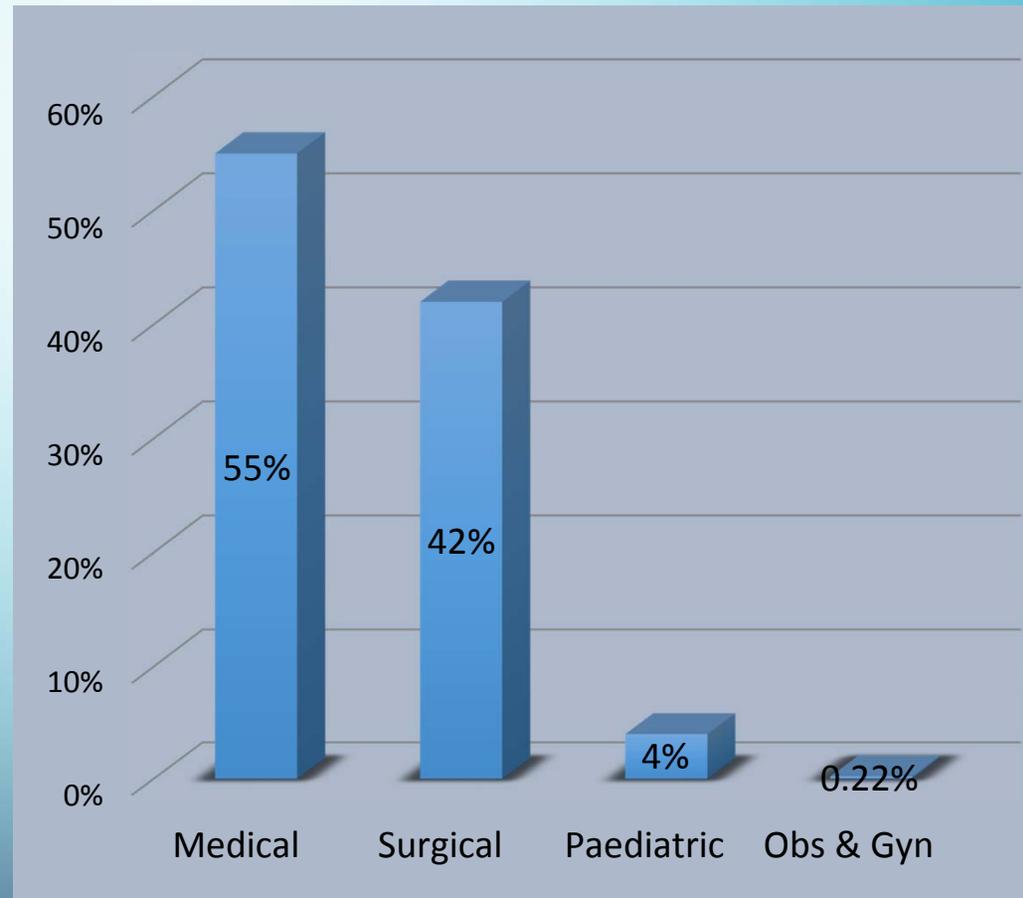
- Prospective observational study was carried out from 1<sup>st</sup> July 2016 to 30<sup>th</sup> June 2017 (1 year) to identify the nature of admissions to A&E Department. Data analysis was done using SPSS(version 2.1)

# RESULTS

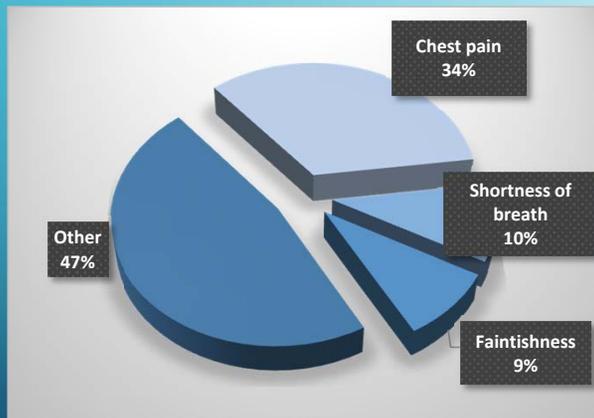
- There were 49213 admissions to A&E Department during the study period. Average number of admissions were 135 (+/-17.9) per day. Deaths in A&E Department were 0.21%.
- The mean age of the admitted patients was 46.7 (+/- 21.7) years and 62% of them were males.



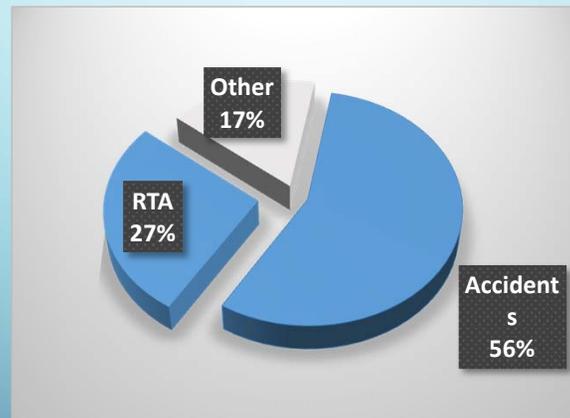
- The frequency of medical, surgical, paediatric and gynaecology and obstetrics admissions were 55%, 42%, 3.5% and 0.22% respectively.



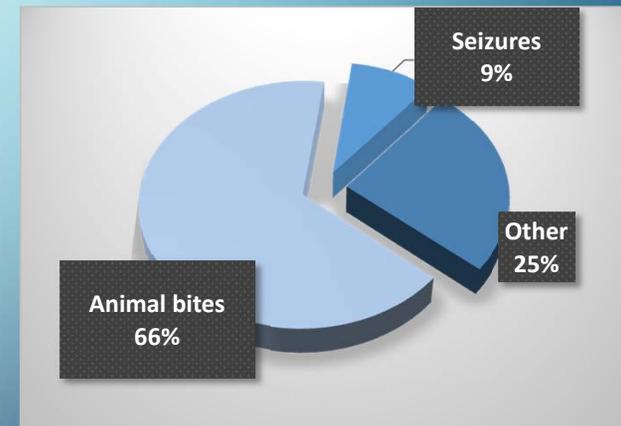
- The common emergency medical presentations included chest pain 34%, shortness of breath 10% and faintishness 9%.



- Among emergency surgical presentations, trauma due to accidents were 83% in which road traffic accidents were 27%.



- The commonest emergency paediatric presentations were animal bites 66% and seizures 8.5%.



# DISCUSSION

- ✓ A&E Department of THK provides services to a significantly high number of health emergencies every day.
- ✓ The majority of these admissions were due to chest pain and trauma from accidents.
- ✓ The lower recorded number of paediatric, gynaecological and obstetric emergencies presented to the A&E Department is a results of national A&E policy to admit these patients directly to their respective wards.
- ✓ Further infrastructure development, with dedicated chest pain unit, staff recruitment and training has to be planned to cater this high number of A&E admissions to A&E Department of THK.

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# Predicting the Risk of Sepsis using Tree Augmented Bayesian Networks

Presenter



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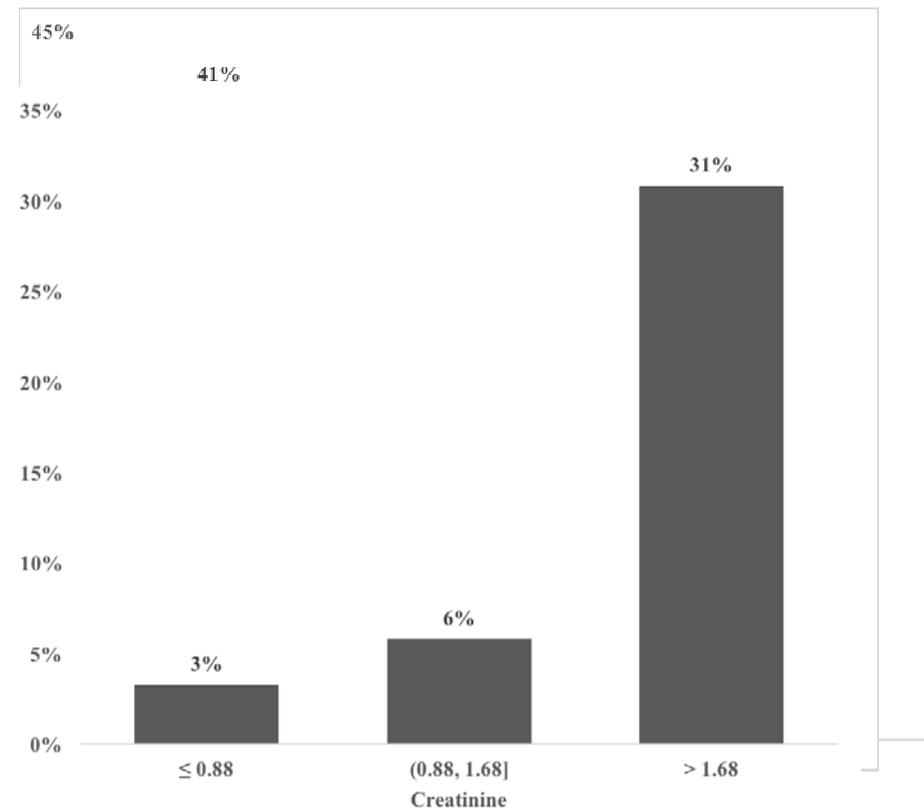
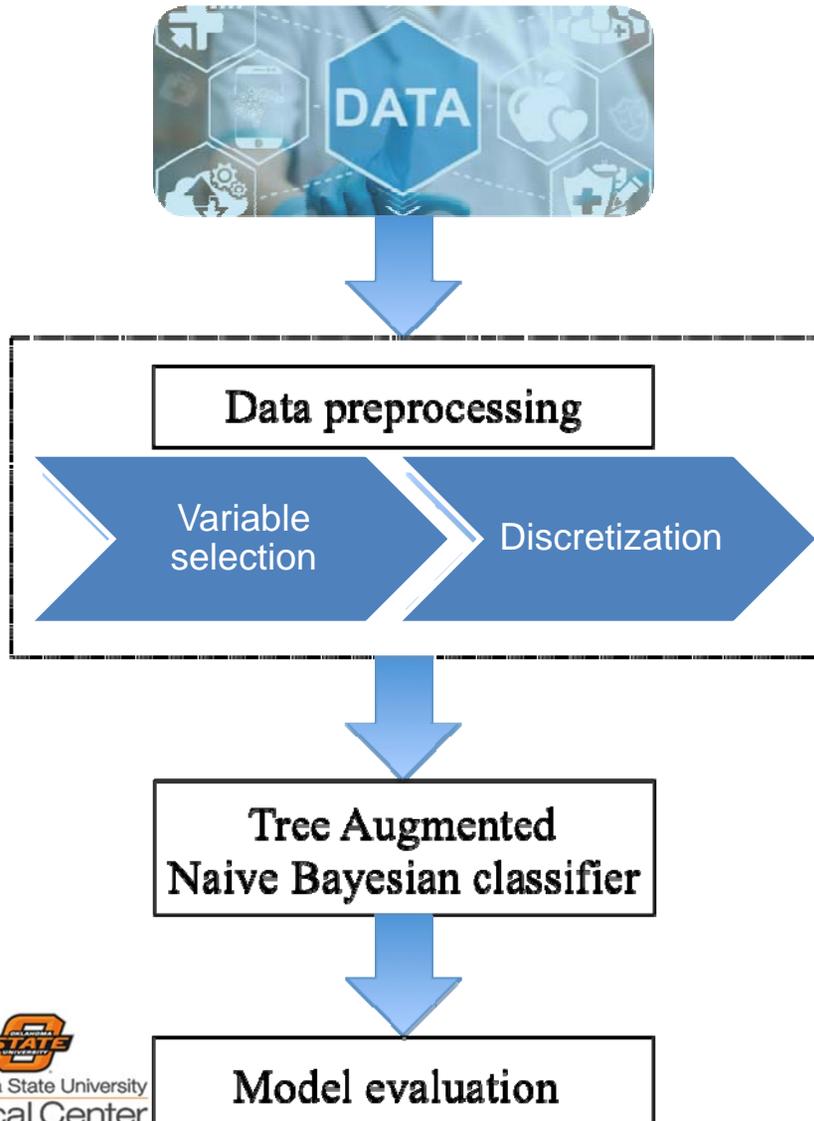
# Introduction

**Objective:** This study aims to identify the optimal set of variables to predict the risk of sepsis and use these variables to construct a tree augmented Bayesian network to predict the risk of sepsis among patients with a suspected infection.

## Highlights:

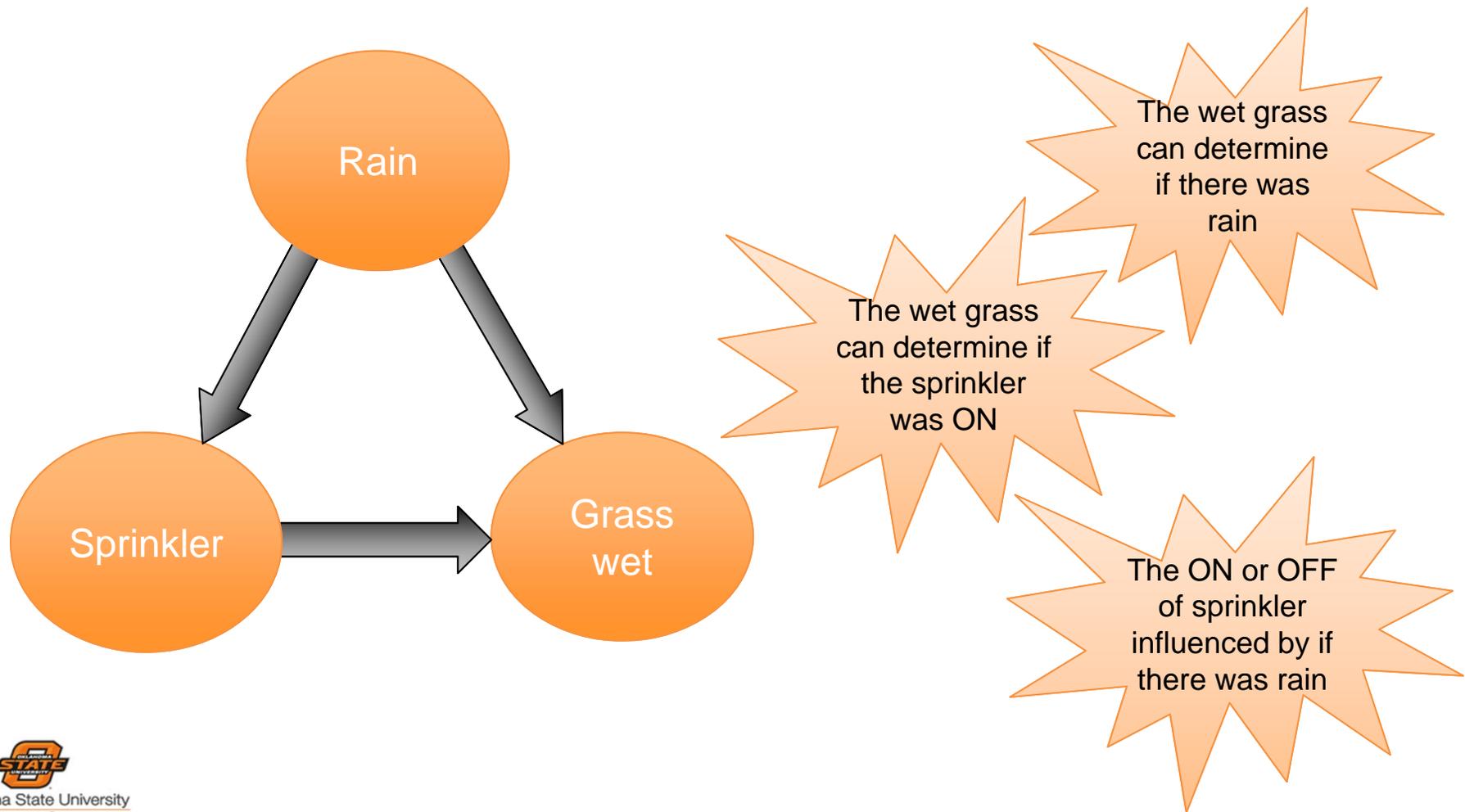
- 1) Identify critical biomarkers that are strongly associated with mortality in sepsis
- 2) Propose a probabilistic graphical model to assess the risk of mortality
- 3) Achieve high balance between sensitivity and specificity
- 4) Require fewer lab tests than Sepsis-related Organ Failure Assessment (SOFA)
- 5) Better prognostic accuracy than alternate criteria (SIRS<sup>1</sup>, qSOFA<sup>2</sup>, MEWS<sup>3</sup>, SOFA<sup>4</sup>)

# Framework



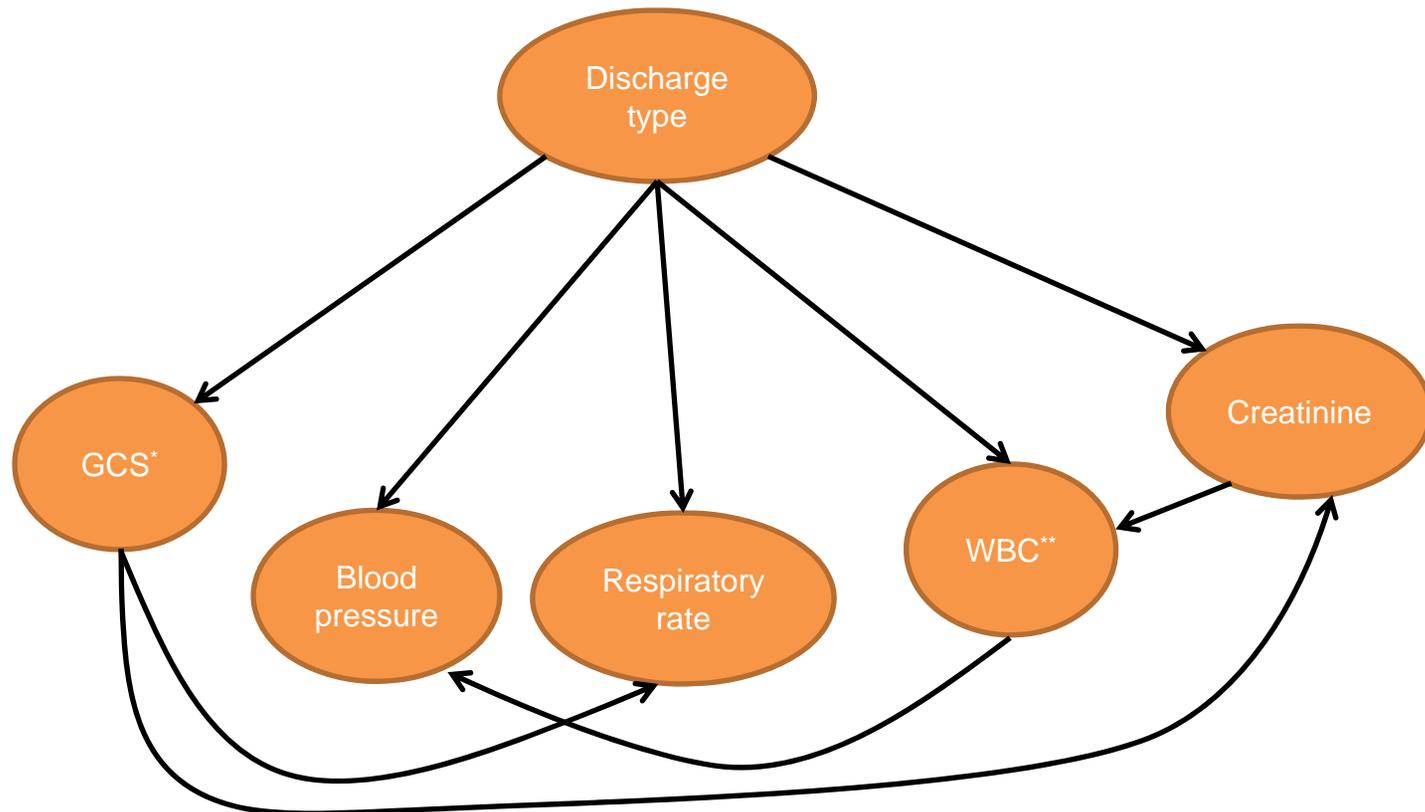
- Age
- Gender

# Understanding of Bayesian Networks with an Example



# Results

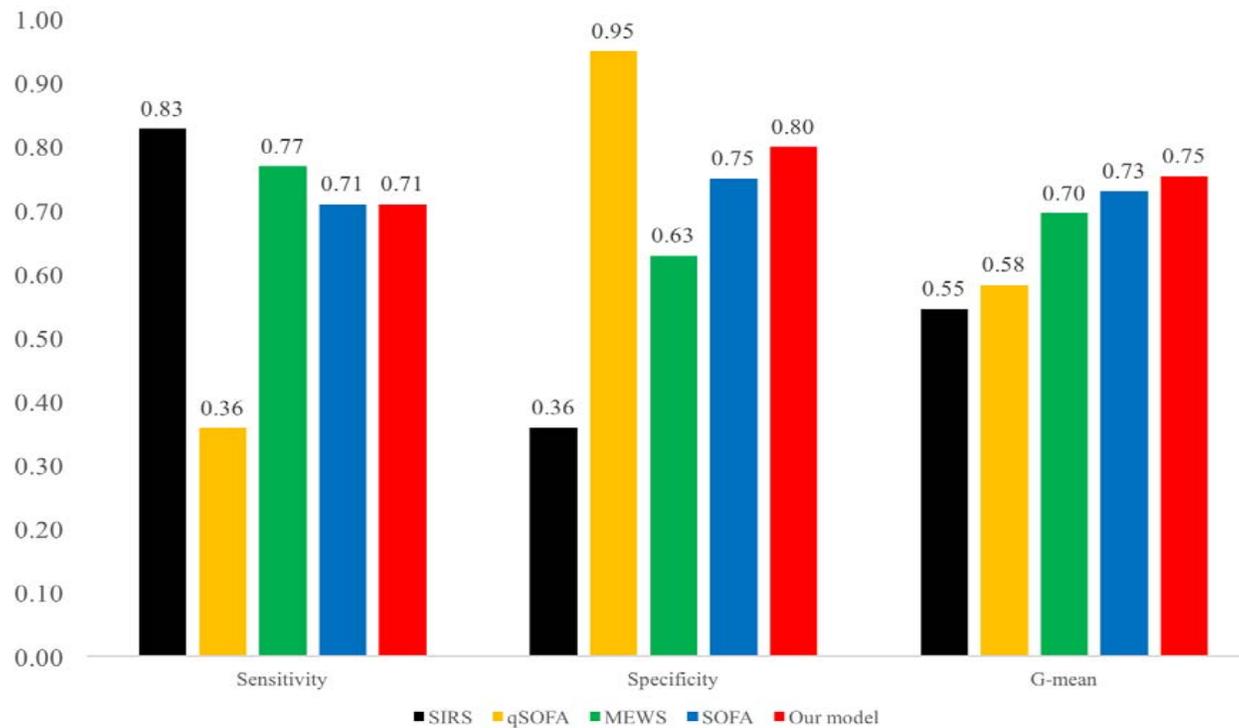
- Proposed model to determine the risk of mortality in sepsis using tree augmented Bayesian network



# Results

- Comparison of proposed model with existing diagnostic criteria
- G-mean is the geometric mean of sensitivity and specificity, and is derived in such a way that it has maximum value when both sensitivity and specificity are maximum

$$\text{G-mean} = (\text{Sensitivity} \times \text{Specificity})^{0.5}$$

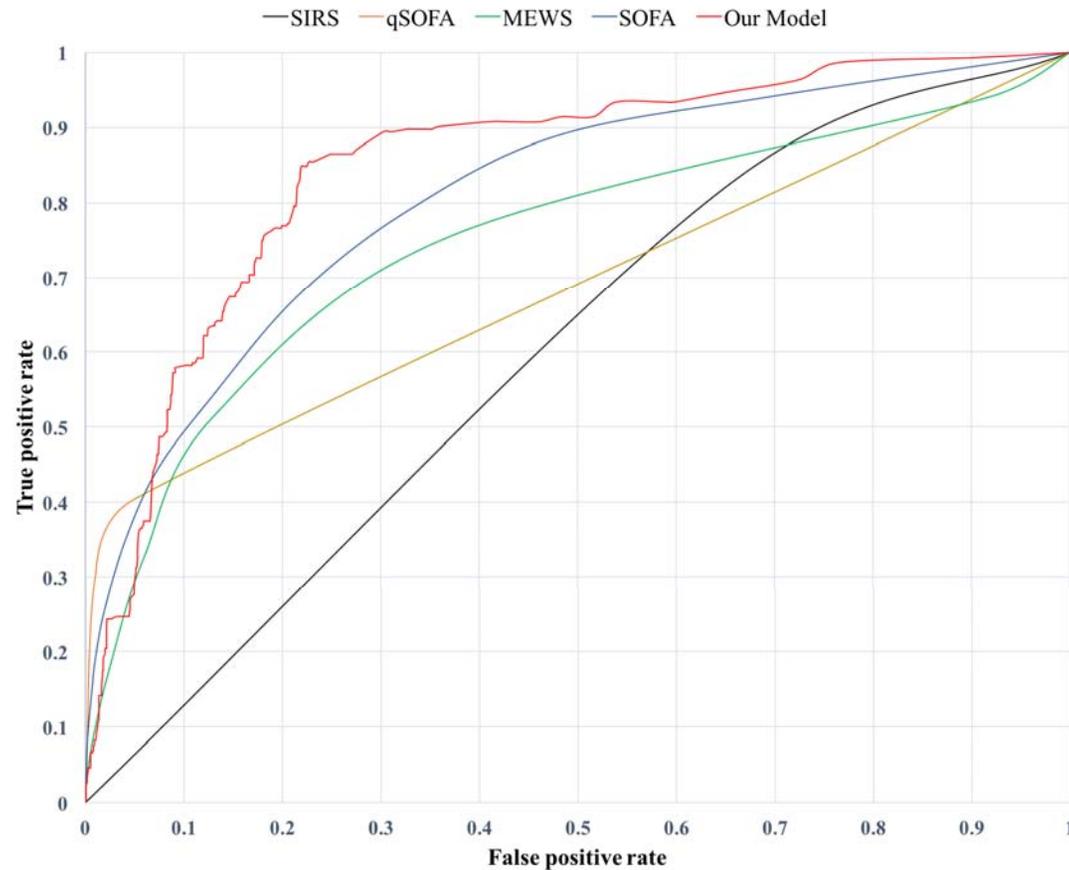


# Results

- Comparison of receiver operating characteristic curve of propose model to existing diagnostic criteria

Diagnostic criteria  
(AUROC\*):

- 1- SIRS (0.59);
- 2- qSOFA (0.65);
- 3- MEWS (0.75);
- 4- SOFA (0.80);
- 5- Our model (0.84)

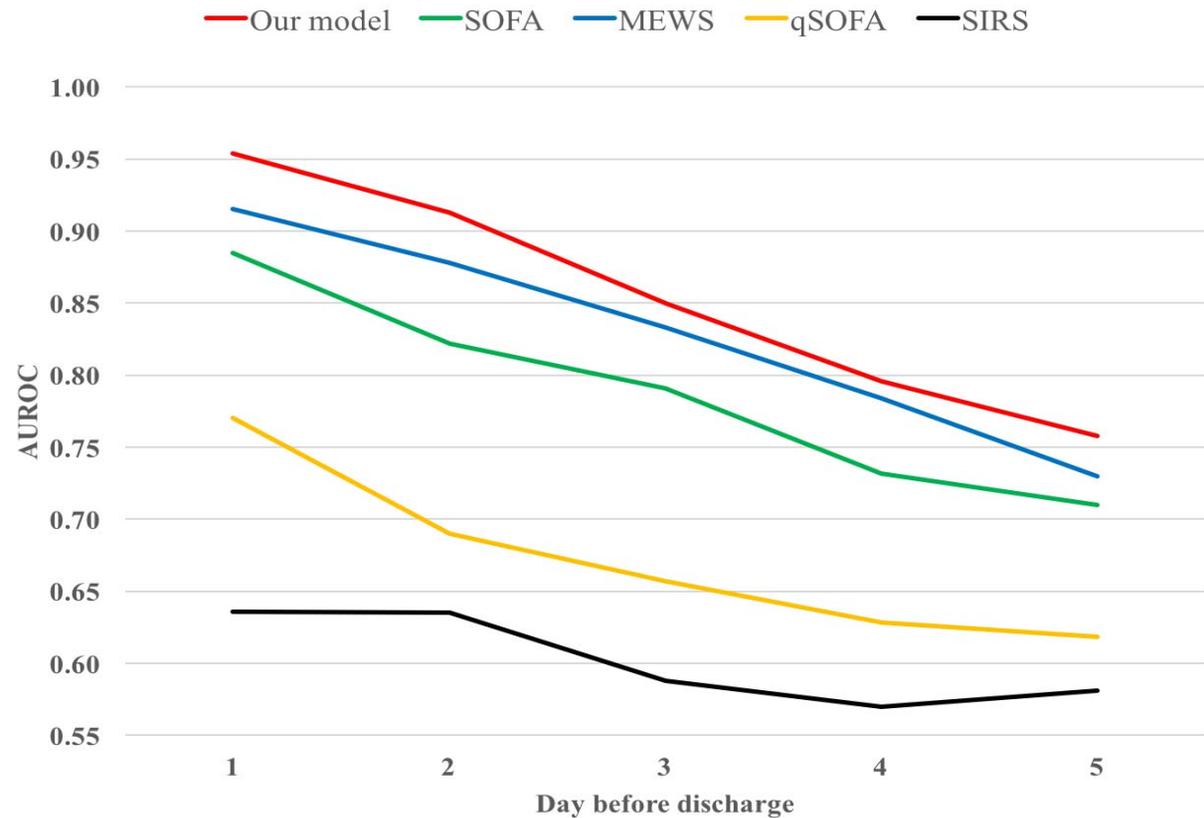


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\* AUROC: Area under receiver operating characteristic curve

# Results

The AUROC of our model is always 3-5% greater than SOFA



# Conclusions

- Proposed an easy-to-use tree augmented Bayesian network to assess the risk of mortality in sepsis
- Achieved higher accuracy by using fewer lab results than SOFA
- Our model can easily be integrated in electronics health record environment and autonomously identify patients at risk

## Selected References:

- Singer, M., Deutschman, C. S., Seymour, C. W., Shankar-Hari, M., Annane, D., Bauer, M., ... & Hotchkiss, R. S. (2016). The third international consensus definitions for sepsis and septic shock (sepsis-3). *Jama*, 315(8), 801-810.
- Topuz, K., Uner, H., Oztekin, A., & Yildirim, M. B. (2017). Predicting pediatric clinic no-shows: a decision analytic framework using elastic net and Bayesian belief network. *Annals of Operations Research*, 1-21.
- Vincent, J. L., Moreno, R., Takala, J., Willatts, S., De Mendonça, A., Bruining, H., ... & Thijs, L. G. (1996). The SOFA (Sepsis-related Organ Failure Assessment) score to describe organ dysfunction/failure.



# Deactivation of a Total Artificial Heart: Honoring a Patient's Final Wish

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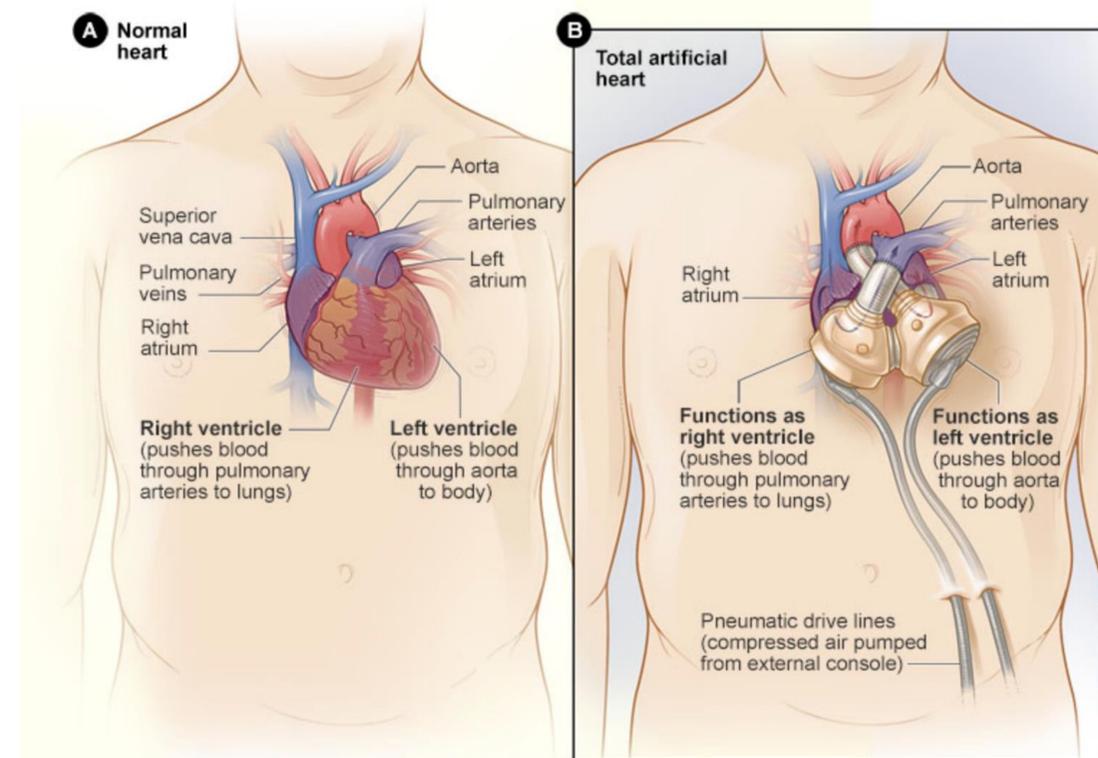
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## BACKGROUND

- The use of **mechanical circulatory support (MCS)**, including **total artificial hearts (TAH)**, has increased six-fold over the past decade
- The TAH is a form of MCS implanted in patients who have irreversible biventricular failure as a bridge to cardiac transplant
- Figure A shows a normal heart and Figure B shows the TAH
- Complications can develop leading to removal from the transplant list, raising the issue of deactivation of the TAH
- This case highlights the importance of not only supporting the patient and their family in deactivation circumstances but the critical role of supporting the medical team
- **By supporting the medical team the patient's values and concerns can be upheld**

## CASE DESCRIPTION

- **Mr. F was a 63 yo man with a TAH awaiting transplant**
- His prolonged ICU course was complicated by renal failure requiring dialysis, respiratory failure requiring tracheostomy, and systemic Aspergillus resulting in seeding of the mediastinum
- Given the inability to cure the fungal infection he was no longer a candidate for cardiac transplant.
- Despite his multisystem organ failure Mr. F retained capacity, communicating his final wish in writing; he chose to turn off his TAH, understanding this would lead to death
- He did not want to burden his wife with making the decision of "turning him off"
- **His family supported the decision**
- **Conversely the medical team did not**



**FIGURE A:**  
Shows the normal structure and location of the heart

**FIGURE B:**  
Shows the TAH including the tubes that exit the body and connects to a machine that powers and controls the TAH

**REFERENCE:** <https://www.nhlbi.nih.gov/health-topics/total-artificial-heart>

## DEACTIVATION

- Members of the medical team voiced concerns deactivation would be a form of **physician assisted suicide** and it would be against the medical oath to do no harm
- There was refusal to physically turn off the machine and administer medications necessary for the deactivation
- **Ethics was consulted due to the turmoil surrounding the case and concluded the patient had the ability to make the decision even if the medical team was conflicted**
- The medical team was professionally and ethically obligated to try and maximize the patient's comfort and not abandon him.
- With the assistance of the Palliative Care team the medical team turned off the TAH at 10:25 am, honoring Mr. F's final wish
- **Surprisingly, after deactivation the medical team were the primary utilizers of the Palliative Care Support team for symptoms of distress, not the family**

## DISCUSSION

- **There is a consensus in the literature, both legally and ethically, patients have the right to withdraw life-sustaining interventions when the burdens exceed benefits**
- The medical team must uphold the patient's autonomy but cannot ignore their own wellbeing especially with MCS
- Healthcare providers may view themselves as the proximate cause of the patient's death when they are tasked with deactivation of the device which can create an enormous psychological burden
- **It is critical to not forget about the well-being of the medical team before, during, and after deactivation of MCS**