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Endoscopic management of post-liver transplant biliary complications

Mohit Girotra, Kaartik Soota, Jagpal S Klair, Shyam M Dang, Farshad Aduli

Abstract

Biliary complications are being increasingly encountered in post liver transplant patients because of increased volume of transplants and longer survival of these recipients. Overall management of these complications may be challenging, but with advances in endoscopic techniques, majority of such patients are being dealt with by endoscopists rather than the surgeons. Our review article discusses the recent advances in endoscopic tools and techniques that have proved endoscopic retrograde cholangiography with various interventions, like sphincterotomy, bile duct dilatation, and stent placement, to be the mainstay for management of most of these complications. We also discuss the management dilemmas in patients with surgically altered anatomy, where accessing the bile duct is challenging, and the recent strides towards making this prospect a reality.

Ribavirin induced hemolysis: A novel mechanism of action against chronic hepatitis C virus infection

Kaartik Soota, Benedict Maliakkal

Abstract

Hepatitis C virus (HCV) is not usually cleared by our immune system, leading to the development of chronic hepatitis C infection. Chronic HCV induces the production of various cytokines, predominantly by Kupffer cells (KCs), and creates a pro-inflammatory state in the liver. The chronic dysregulated production of interferon (IFN) and other cytokines by KCs also promotes innate immune tolerance. Ribavirin (RBV) monotherapy has been shown to decrease inflammation in liver of patients with chronic hepatitis C. Sustained virological response (SVR) is significantly higher when IFN is combined with RBV in chronic HCV (cHCV) infection. However, the mechanism of their synergy remains unclear. Previous theories have attempted to explain the anti-HCV effect based on direct action of RBV alone on the virus or on the immune system; however, these theories have serious shortcomings. We propose that hemolysis, which universally occurs with RBV therapy and which is considered a limiting side effect, is precisely the mechanism by which the anti-HCV effect is exerted. Passive hemolysis results in anti-inflammatory/antiviral actions within the liver that disrupt the innate immune tolerance, leading to the synergy of RBV with IFN-α. Ribavirin-induced hemolysis floods the hepatocytes and KCs with heme, which is metabolized and detoxified by heme oxygenase-1 (HMOX1) to carbon monoxide (CO), biliverdin and free iron (which induces ferritin). These metabolites of heme possess anti-inflammatory and antioxidant properties. Thus, HMOX1 plays an extremely important anti-oxidant, anti-inflammatory and cytoprotective role, particularly in KCs and hepatocytes. HMOX1 has been noted to have anti-viral effects in hepatitis C infected cell lines. Additionally, it has been shown to enhance the response to IFN-α by restoring interferon-stimulated genes (ISGs). This mechanism can be clinically corroborated by the following observations that have been found in patients undergoing RBV/IFN combination therapy for cHCV: (1) SVR rates are higher in patients who develop anemia; (2) once anemia (due to hemolysis) occurs, the SVR rate does not depend on the treatment utilized to manage anemia; and (3) ribavirin analogs, such as taribavirin and levovirin, which increase intrahepatic ribavirin levels and which produce lesser hemolysis, are inferior to ribavirin for treating cHCV. This mechanism can also explain the observed RBV synergy with direct antiviral agents. This hypothesis is testable and may lead to newer and safer medications for treating cHCV infection. © 2014 Baishideng Publishing Group Inc. All rights reserved.

Adult-onset idiopathic isolated central hypothyroidism

Chi Tang, M.D.

Background: Central hypothyroidism is commonly associated with impaired secretion of other pituitary hormones. Isolated impairment of TRH-TSH-thyroid hormone axis is rare and was mostly identified in children due to genetic mutations or in adults due to morphological changes of pituitary gland.

Case Report: we present one patient who was diagnosed with central hypothyroidism as an adult. She had no family history of hypothyroidism or apparent morphological changes of pituitary gland on MRI. Other anterior pituitary hormones including FSH, prolactin, cortisol and IGF-1 were normal. She was not taking any medication that can impact thyroid function and she was not in critical illness at the time of thyroid function tests. We did not find clear etiology for her hypothyroidism.

Discussion: Our patient had “adult-onset idiopathic isolated central hypothyroidism”. There have been five reports involving a total of eight patients with the same disease and a few possible cases in the literature. It might be an autoimmune disease with auto-antibodies that only target TRH/TSH secreting cells. Direct measurement of TRH level may provide more information regarding the location of the lesion.

Conclusion: “Adult-onset idiopathic isolated central hypothyroidism” may not be as rare as previously believed. Patients with this disease present with similar clinical findings as peripheral hypothyroidism. Symptomatic patients responded well to levothyroxine with good prognosis.

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How well do we need to control blood glucose level before discharging DKA patients? A retrospective cohort study

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Purpose: To determine the ideal length of stay and glycemic control after resolution of acidosis in patients hospitalized for diabetic ketoacidosis, in order to reduce 30-day readmission. We hypothesized that discharging patients within 24 hours of acidosis resolution and hyperglycemia at the time of discharge are associated with higher probability of readmission.

Methods: We examined data from 208 consecutive patients who were hospitalized for diabetic ketoacidosis. Logistic regression analysis was performed. Outcome variable is 30-day readmission rate. Predictive variables are blood glucose (BG) at discharge and average BG over the last 24 hours of hospitalization. Confounders adjusted include age, BG at presentation, prior hospitalization within 30 days, season in which patient was discharged from current hospitalization and length of hospital stay. In order to reduce the impact of influential observations, the two predictive variables were converted to categorical variables and analyses were repeated.

Results: Higher BG at discharge is associated with lower probability of readmission (Odds ratio, 0.990; 95% CI, 0.983 to 0.996; P=0.002). Higher average BG over last 24 hours of hospitalization is associated with lower readmission rate (Odds ratio, 0.991; 95% CI, 0.982 to 1.000; P=0.044). The direction of the association remains the same even after the predictive variables are converted to categorical variables. In addition, discharge within 24 hours of acidosis resolution is not inferior to waiting for 24 hours of normalized BG before discharge (Odds ratio, 0.431; 95% CI, 0.083 to 2.252; P=0.318).

Conclusion: Discharging patients within 24 hours of acidosis resolution and hyperglycemia at the time of discharge are possibly associated with a lower readmission rate. Randomized prospective studies are needed to confirm or refute our study.

Presented at American Medical Association research symposium, Dallas, TX

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WHAT’S WRONG WITH THIS ARTERY? A MEDICAL DISEASE DISCOVERED BY A SURGEON!

Vasvi Singh MD, Saurav Luthra MD, Ruth Kouides MD, Abdel K. Gadir MD

Summary:
50-year-old male presented with intermittent chest pain in October 2011. He had positive stress echocardiography; and angiogram in November 2011 showed single-vessel Coronary Artery Disease (CAD). He was started on optimal medical therapy with good compliance. In March 2012, about 4 months later, he was admitted to the hospital for Non-ST segment Elevation Myocardial Infarction (NSTEMI). Urgent cardiac catheterization surprisingly showed severe three-vessel CAD. He was referred for Coronary Artery Bypass Grafting (CABG), and during the procedure, the cardiothoracic surgeon noticed severely inflamed coronary arteries, concerning for vasculitis. Subsequent work-up including Anti-Nuclear Antibodies and Angiotensin Converting Enzyme levels, CT chest, lymph-node biopsy and Cardiac Magnetic Resonance Imaging was highly suggestive of sarcoidosis. He has remained free of any further ischemic events, while on immunosuppressive therapy for coronary sarcoidosis for 20 months now. This is a rare case and extends the clinical spectrum of cardiac sarcoidosis, presenting with rapidly progressive CAD.

Background:
Sarcoidosis is a multisystem, inflammatory disease of unknown etiology, characterized by non-caseating granulomas that may involve any organ in the body. The most common organs involved in sarcoidosis are lungs and lymph nodes. Cardiac involvement was demonstrated in an autopsy study in about 20-30% of sarcoidosis patients. However only a fraction of these patients, about 5% or less, presented with symptoms of cardiac involvement during their lifetime [1,2]. The most commonly recognized manifestations of cardiac sarcoidosis include those of conduction abnormalities, congestive heart failure, cardiomyopathy, and sudden cardiac death. Epicardial coronary artery infiltration with coronary sarcoid is a recently recognized entity, and is commonly missed as it simulates acute coronary syndrome caused by atherosclerotic cardiovascular disease. We report this unique rare case of cardiac sarcoidosis, presenting with rapidly progressive CAD.

Case presentation:
A 50-year-old African-American male with hypertension, diabetes mellitus and peptic ulcer disease, presented to primary care’s office in October 2011 with intermittent substernal chest pain for the past few months. No family history of premature coronary artery disease, and no personal history of smoking, alcohol or drug abuse. He was referred for stress echocardiographic test, which showed focal wall motion abnormalities and a subsequent coronary angiogram in November 2011, showed single-vessel CAD.
with 50% stenosis in proximal Left Circumflex artery with complete distal occlusion, and normal ejection fraction (EF) of 60% [Figure 1, 2]. He was started on optimal medical therapy with aspirin, statin, beta-blocker and long-acting nitrate, along with aggressive risk factor modification, with good compliance. However, he kept on experiencing these episodes of chest pain but did not seek any medical attention. Then in March 2012, about 4 months after the first coronary angiogram, he presented to the Emergency Department with an episode of severe chest pain, with significant changes on Electrocardiogram (ECG) [Figure 3] and mildly elevated troponin. He was admitted to the hospital with a diagnosis of NSTEMI. He underwent an urgent cardiac catheterization, that surprisingly showed severe three-vessel CAD with 95% stenosis in mid and distal Left Anterior Descending (LAD) artery, and 90% stenoses in First Diagonal branch, Left Circumflex and Obtuse Marginal branches, and Distal Right Coronary artery (RCA) [Figure 4, 5]. Left ventricular systolic function was still preserved at 60%. This demonstrated a very rapid progression of CAD, presumed to be of atherosclerotic origin, in just a brief period of 4 months. He was immediately referred for CABG, and during the procedure, the cardiothoracic surgeon noticed the coronary arteries did not have a typical atherosclerotic picture, but instead looked severely inflamed, very concerning for some sort of arteritis. Although the aorta looked normal, he did a punch biopsy of it, which later came back normal. Clopidogrel was added to his cardiac regimen after a multi-vessel CABG. The patient was referred to Rheumatology on discharge, but before he could see them, got re-admitted in July 2012, for chest pain, with positive ECG changes and troponin levels, and was diagnosed with NSTEMI. He mentioned still having intermittent chest pain post hospital discharge, but he chose to ignore them for a while. This time, a third angiogram within the past 9 months showed three-vessel CAD as before, with widely patent 5 of 6 bypass grafts and overall preserved left ventricular systolic function. Cardiology recommended continuing optimal medical treatment, with considering adding ranolazine if his chest pain continued. Rheumatology was consulted in-house now, for the high suspicion of a vasculitis and a detailed autoimmune work-up was positive for a high titer of nucleolar pattern Anti-Nuclear Antibodies and high levels of Erythrocyte Sedimentation Rate (ESR), C-Reactive Protein (CRP) and Angiotensin Converting Enzyme (ACE). Hepatitis panel, HIV screen, Anti-Myeloperoxidase and Anti-Proteinase Antibodies were negative. He was started on empiric high dose corticosteroids. Imaging work-up in the form of CT chest showed bilateral mediastinal and hilar adenopathy, with multiple pulmonary nodules [Figure 6]. Mediastinoscopy and biopsy of mediastinal nodules showed non-necrotizing granulomatous inflammation highly suggestive of sarcoidosis. Cardiac Magnetic Resonance Imaging (MRI) showed left ventricular basal infero-lateral and mesocardial enhancement again pointing towards an infiltrative process like sarcoidosis [Figure 7].
TREATMENT:

He was discharged from the hospital on high dose oral prednisone (60mg oral daily) and outpatient this was tapered to a low maintenance dose (15mg oral daily), after the addition of Methotrexate (20mg oral weekly) and Hydroxychloroquine (200 mg oral twice a day) by Rheumatology.

OUTCOME AND FOLLOW-UP:

He has been on immunosuppressive therapy for coronary sarcoidosis for 21 months, and as of now, has not had any further chest pain or admissions for ischemic events.

DISCUSSION:

An exhaustive English-language literature review did not reveal any previous case reports describing such a peculiar rapid progression of coronary artery disease from coronary sarcoidosis. One case report described a 47-year-old Caucasian male with non-necrotizing granulomas in the walls of epicardial coronary arteries, found on histological examination of his explanted heart after he underwent an orthotopic heart transplant for presumed Idiopathic Dilated Cardiomyopathy (IDCM) [7]. This patient presented with progressive congestive heart failure despite aggressive medical management. His 2D echocardiogram showed a reduced EF and normal coronary anatomy on angiogram. In another case report of a 40-year-old white male who presented with increasing shortness of breath and chest pain, an d was diagnosed with a complete heart block, Cardiac MRI demonstrated epicardial fat infiltration surrounding the large coronary arteries. Echocardiography showed an EF of 30% and normal cardiac catheterization [8].

So, in both these cases, angiogram was normal and ejection fraction was low. Notably, in our case the ejection fraction remained preserved, despite such a diffusely diseased coronary vasculature demonstrating that this was not primarily a myocardial process.

We found only one case report of biopsy proven coronary sarcoidosis of a 68-year-old African-American male, with a known history of non-caseating granulomas found on lymph-node biopsy in the past and treatment with prednisone then [9]. He presented with a myocardial infarction, 6 years later, and underwent stenting of the LAD, but presented with re-stenosis of the culprit vessel four times over the following year despite target vessel revascularization at each presentation. Biopsy from the epicardium of the RCA revealed non-caseating granulomatous inflammation. He was treated with prednisone and mycophenolate mofetil. However this patient had a history highly suggestive of sarcoidosis in the recent past, in contrast to our patient where the diagnosis of sarcoidosis was made with coronary vasculitis as the initial presentation.

Cardiac sarcoid typically presents as arrhythmias, conduction defects and heart failure. This case extends this spectrum of clinical presentation of cardiac sarcoid presenting
with rapidly progressive coronary heart disease. Of note, the patient described ultimately responded to immunosuppressive therapy.

**Learning points:**

Cardiac sarcoidosis is rare, and concomitant involvement of the epicardial coronary arteries is rarer still.

Cardiac sarcoidosis typically presents as arrhythmias, conduction defects and heart failure.

This case extends the clinical spectrum and gives us an insight into a rare presentation of cardiac sarcoidosis, presenting with rapidly progressive coronary heart disease.

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Shunting to relieve the pressures of graduate school...literally

Vasvi Singh, Saurav Luthra, Michael DiSalle

Description: A 28-year-old woman with a history of hydrocephalus diagnosed as a part of amenorrhea work-up at the age of 18, presented to her primary care doctor’s office with acute onset of neck pain, nausea and vomiting of 1-week duration. She also reported light-headedness with position change but no fever, chills or photophobia. Her vitals were stable except for a mildly elevated blood pressure.

While in the office she had a syncopal attack and an urgent CT of the head demonstrated massive non-communicating hydrocephalus (figure 1). She was admitted to the hospital and in the midst of her neurosurgical work-up she suffered a generalised seizure and underwent emergent ventriculoperitoneal (VP) shunt placement. Her symptoms improved significantly and she returned to graduate school within weeks and is on track to complete her masters in occupational therapy. Neurosurgery is monitoring her with periodic neuroimaging (figure 2).

Figure 1 CT of the head without contrast at age 28. Severe hydrocephalus involving the lateral ventricles is noted and the cerebral sulci appear effaced suggesting cerebral oedema.
Figure 2 MRI of the brain at age 28. Right-sided ventriculoperitoneal shunt catheter is noted. The lateral ventricles remain dilated but have mildly decreased in overall size. The effacement of cerebral sulci has markedly improved.

Learning points:

Clinically, patients with intrinsic aqueductal stenosis commonly present with chronic symptoms such as delayed psychomotor development, difficulties in school, chronic headache and growth retardation. Acute presentations in the form of headache, nausea, vomiting and changes in mental status are rare in all age groups.\textsuperscript{1}

Endocrine manifestations are found in about one-tenth of adolescents with aqueductal stenosis, likely secondary to chronic compression of the hypothalamic–pituitary axis. Men may be obese with features of precocious puberty, hypogonadism and diabetes insipidus. Women may present with obesity and amenorrhoea.\textsuperscript{2}

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DETECTION OF AN INSULIN ANALOG USING LIQUID CHROMATOGRAPHY COUPLED TO ION MOBILITY MASS SPECTROMETRY (LC-IM-MS) IN A PATIENT WITH FACTITIOUS HYPOGLYCEMIA

Amer Issa MD, Juman Takeddin, MD, Jon Nakamoto MD, Mario Thevis PHD, K.K Rajamani MD

Abstract:

Introduction:

Factitious hypoglycemia should be considered in every patient evaluated for a hypoglycemic disorder. In the case of exogenous insulin injection, detection of the type of injected insulin has been a challenge. We present a case of a non-diabetic woman who presented with hypoglycemia. Her laboratory data suggested the exogenous use of insulin. Additional testing revealed the type of injected insulin, which confirmed the diagnosis of factitious hypoglycemia.

Case presentation:

A 41-year-old non-diabetic woman was admitted to the hospital after being found unresponsive. Her fingerstick blood glucose was <20 mg/dL. She was treated with IV D50 and immediately regained consciousness. She denied any history of similar episodes, use of insulin or her husband’s oral hypoglycemic medications, or intention of self-harm. She had normal vital signs and physical exam.

Laboratory results were as follows: blood glucose 38 mg/dL, insulin 3904 uIU/mL (3-25 uIU/ml), C-peptide <0.1 ng/mL (0.8-3.9 ng/ml), and beta-hydroxybutyrate <0.1 mmol/L (<0.4 mmol/L). These results were suggestive of exogenous hyperinsulinemic hypoglycemia. A sulfonylurea panel was negative, and a CT scan of the abdomen was normal. On day 2, her blood glucose was 31 mg/dL, insulin 231.6 uIU/mL, C-peptide <0.1 ng/mL, and pro-insulin <5 pmol/L (≤ 18.8 pmol/L). On day 3, her hypoglycemia resolved.

Insulin levels were measured in blood samples from days 1 and 2 using liquid chromatography-mass spectrometry (LC-MS, Quest Diagnostics), which specifically tests for human insulin, and were found to be 4.7 uIU/mL and <6 uIU/ml respectively. To confirm the type of synthetic insulin used, an LC-IM-MS assay was done, and insulin aspart was detected. Later it was discovered that the patient’s husband was on insulin aspart in addition to oral agents.

Discussion:

Insulin is commonly measured using immunochemiluminometric assays (ICMA) which show variability between different platforms. The Siemens Advia Centaur platform used in our laboratory measures both human and analog insulin. While these immunoassays lack specificity for the type of insulin, LC-MS based approaches can provide a highly...
specific alternative. LC-IM-MS is a new technique which can determine the type of insulin analog used, as was demonstrated in this case.

**Conclusion:**

Factitious use of insulin is a rarely detected but dangerous cause of hypoglycemia in non-diabetic patients. Understanding the specific detection capabilities of each assay is essential to the evaluation of factitious insulin-induced hypoglycemia.

- Presented at AACE (American Association of Clinical Endocrinologists) annual meeting Nashville, Tennessee 2015
- Accepted for publication as e.poster on AACE website.
- Travel grant award winner
Immunomodulation for Treatment of Drug and Device Refractory Gastroparesis: A Pilot Study

Kaartik Soota, MD, Archana Kedar, MD, Yana Nikitina, MD, Evelyn Arendale, RN, Vetta Vedanarayanan, MD, Thomas L. Abell, MD

Publication under review in – Canadian Journal of Neurological Sciences

Abstract

Background: Patients with generalized autoimmune dysautonomia may also present with gastroparesis. Immune dysfunction in such patients can be evaluated using antibodies to glutamic acid decarboxylase (GAD) and full thickness biopsy of stomach. In this study, we utilize immunotherapy for treatment of drug and Gastric Electrical Stimulation (GES) resistant gastroparetic patients who had evidence of neuroinflammation on full thickness gastric biopsy and had positive GAD65 autoantibodies.

Methods: We conducted a retrospective chart review of 11 female patients with drug and device resistant gastroparesis. Patients were treated for a total of 8-12 weeks with either intravenous immunoglobulin (IVIg), or combined mycophenolate mofetil (MM) and methylprednisolone, or only MM. Patients were excluded if they had previous side effects from steroid therapy, low scores on dual-energy X-ray absorptiometry (DEXA) scan results, immune-compromised conditions with infections like tuberculosis and zoster. Symptoms of nausea, vomiting, abdominal pain, early satiety/anorexia, bloating and total symptom score (TSS) as reported by the patients were recorded before and after the treatment at a follow up visit 2 to 16 weeks after the initiation of therapy.

Results: Maximum symptom improvement was seen in patients treated with IVIg (67%). 6 patients (55%) had improvement in vomiting, whereas 5 patients (45%) had improvements in nausea, abdominal pain and bloating.

Discussion: Immunomodulatory therapy shows positive outcomes in improving vomiting symptom in some gastroparetic patients who have coexisting positive autoimmune profiles. This preliminary data suggests the need for further investigations in immunotherapy targeted to patients with gastroparetic symptoms refractory to approved drug and device therapies.
Use of Upper Endoscopy in Solid Organ Transplant Recipients to Determine Utility as a Pre-Transplant Procedure

Kaartik Soota, MD; Grace Shin, MD; Mark Malamood, MD; Frank Friedenberg, MD; Kaveh Sharzehi, MD

BACKGROUND: Gastrointestinal bleeding (GIB) from gastro-duodenal ulcerations have been commonly observed in patients receiving solid organ transplantation. Several factors have been postulated including the use of immunosuppressive medications such as steroids. Some centers have opted for pre-transplant upper gastrointestinal evaluations to predict these complications. However, there have been no outcome studies assessing large number of patients undergoing various solid organ transplantations.

AIMS: To determine the frequency of upper endoscopy performed in post-transplant patients and report the frequency of GIB.

METHODS: We reviewed the charts of all patients who underwent solid organ transplant (kidney, liver, lung or heart) from 2009-2013 at a single transplant center. Data for up to one year post-transplant was reviewed. Patients were excluded if they died within 48 hours of transplant or had no follow up.

RESULTS: 243 patients were identified who underwent solid organ transplantations. 21 patients were excluded for lack of follow-up or early mortality. For the 222 patients included the mean age was 57.0 years with a 72.5% male predominance. Mean length of follow up was 335 days. The organs of transplant were: 31.1% liver, 28.8% kidney, 27.9% lung, 9.5% heart, and 2.7% heart-lung. Among this population, 94.6% were taking steroids, 48.2% were taking non-steroidal anti-inflammatory drugs (NSAIDs) or aspirin, 12.2% were taking anti-coagulants, and 6.8% were on a combination of both. 11.3% of patients had thrombocytopenia (platelets <100). 68.5% were on a proton-pump inhibitor (PPI) and 13.1% on H2 receptor antagonists (H2RA). Of the 16/222 (7.2%) patients requiring an upper endoscopy only 3 (1.4%) were performed for overt GIB. None of the three patients with GIB had thrombocytopenia or coagulopathy. Two with GIB were on aspirin, NSAIDs, and prednisone and one was not on either PPI or H2RA.

CONCLUSIONS: Clinically significant GIB in the one year post-transplant was seen in only 1.4% of the recipients. While many of the recipients were on acid suppression medication, these patients did have multiple risk factors for upper GIB including the use of steroids, NSAIDs, and anti-coagulants. Despite these high-risk states, the incidence of GIB remains low. This study does not support the need for routine pre-transplant upper endoscopy.

Presented at – Annual Meeting of American College of Gastroenterology (ACG) held at Philadelphia in 2014
Clinical Correspondence of Interstitial Cells of Cajal Levels on Full Thickness Gastric Biopsy

C Patel, K Soota, X Yang, M Fraig, K Beatty, Ed Miller, A Kedar, G Hughes, L McElmurray, A Stocker, T Abell

**Goal in writing:** Here we studied diabetic gastroparesis (GP) patients and histopathologic changes on full thickness gastric biopsy (FTB). Patients underwent a 4-5 day trial of temporary gastric stimulation (tGES). If successful, we proceeded with placement of a permanent gastric electrical stimulator (pGES). FTB was obtained from the body-antral junction at the time of pGES placement. With these results we aimed to clinically correlate FTB cell findings.

**Goal in analysis:** The study pathologist examined each FTB for Interstitial Cells of Cajal (ICC) levels in the inner & outer gastric muscularis propria layers. With these findings, GET results at baseline, symptom scores at baseline and changes in symptom scores after tGES we aim to assess the following hypotheses:

- Lower ICC levels correlate with increased baseline symptom scores
- Lower ICC levels correlate with higher gastric retention on GET
- Severely low ICC(<3/hpf) levels correlate with decreased symptom response to tGES

**Introduction/Background:** Recent studies of the pathophysiology behind diabetic GP have placed more emphasis on FTB findings. ICC generate electrical slow waves and thus have a significant function in gastrointestinal motility. ICC levels may correlate with patient symptoms, electrogram findings and predicting response to tGES & pGES.

**Patients:** 12 Diabetic GP patients (6 male, 6 female) with mean age of 48.17 years. 9 were Caucasian and 3 were of another ethnicity. 9 patients had severely low ICC levels(<3/hpf). One patient died prior to evaluation with tGES.

**Methods:** From baseline and 4-5 days after tGES, we recorded patient reported scores for various GP symptoms along with an overall GI total symptom score (TSS) and Gastroparesis Cardinal Symptom Index (GSCI). Percent solid remaining during gastric emptying test(GET) after 4 hours was recorded for each patient. FTB for each patient was stained to determine ICC levels.

**Results:** By linear regression, patients with lower inner layer ICC levels had higher vomiting scores \(r=0.67, p=0.017\) and patients with lower outer layer ICC levels had higher vomiting scores at baseline \(r=0.65, p=0.021\). In patients with severely low ICC, higher outer layer ICC levels correlate with greater percent decrease in vomiting scores after tGES \(r=0.768, p=0.026\). No significant correlation was found between amount of solid retained after 4hr GET and ICC by linear regression.
**Conclusions:** In a small sample of patients with diabetic GP, we found significant correlations with inner and outer layer ICC levels on FTB and baseline vomiting scores and improvement of vomiting with tGES. This suggests ICC levels may play a significant role in vomiting experienced by GP patients, and may help predict the improvement with tGES. Given these findings, further exploration of these hypotheses with greater sample sizes is warranted to assess the role of ICC in diabetic GP.
Outer Layer ICC Counts vs. Baseline Vomiting Score

Outer ICC Levels vs. % Improvement in Vomiting Scores

\[ r=0.65, \ p=0.021 \]

\[ r=0.768, \ p=0.026 \]
Clinical Correspondence of S100 Levels on Full Thickness Gastric Biopsy

C Patel, K Soota, X Yang, M Fraig, W Kennedy, G Wendelschafer-Crabb, K Beatty, Ed Miller, A Kedar, G Hughes, L McElmurray, A Stocker, T Abell

Goal in writing: Here we studied diabetic gastroparesis (GP) patients and histopathologic changes on full thickness gastric biopsy (FTB). Patients underwent a 4-5 day trial of temporary gastric stimulation (tGES). If successful, we proceeded to place a permanent gastric electrical stimulator (pGES). FTB was obtained from the body-antral junction at the time of pGES placement. With these results we aimed to clinically correlate FTB cell findings.

Goal in analysis: The study pathologist examined each FTB for S100 levels in the inner & outer muscularis propria layers. With these findings, GET results at baseline, symptom scores at baseline and changes in symptom scores after tGES, we aim to assess the following hypotheses:

Low S100 levels (<15/hpf) correlate with increased baseline symptom scores
Low S100 levels correlate with decreased symptom response to tGES
Low S100 levels correlate with higher gastric retention on GET

Introduction/Background: Recently more emphasis has been placed on FTB cellular findings in the study of GP. Both ICC & S100 levels may play key roles in correlating with patient symptoms, electrogram findings and predicting response to tGES. S100 cells have been hypothesized to play a role in abdominal pain with GP. As S100 levels are known markers for neurological activity in GI motility this suggests a neuropathic component to the abdominal pain. This leaves to question if S100 levels play a role in other GP symptoms as neurological sequelae in diabetic GP.

Patients: 9 Diabetic GP patients (5 male, 4 female) with mean age of 49.67 years. 8 were Caucasian and one was of an “other” ethnicity. One patient died prior to evaluation with tGES.

Methods: From baseline and 4-5 days after tGES, we recorded patient reported scores for various GP symptoms along with an overall GI total symptom score (TSS) and total Gastroparesis Cardinal Symptom Index (GCSI). Percent solid remaining during gastric emptying test (GET) after 4 hours was recorded for each patient. FTB for 8 patients were stained for S100 levels.

Results: By linear regression, patients with higher inner layer S100 levels correlated with greater percent improvement in pain, nausea, anorexia/early satiety & overall GI TSS and GCSI after tGES (Table 1). No significant correlation was found between S100
levels and baseline patient symptoms. No significant correlation was found between amount of solid retained after 4hr GET and S100 levels.

**Conclusions:** Previous studies show tGES to be effective in reducing patient symptoms. In a small sample of patients with diabetic GP we found inner layer S100 levels on FTB may predict symptom response to tGES. However no particular cell from biopsy has been found to predict this degree of improvement in symptoms after tGES. Given these findings, further exploration with greater sample sizes is warranted to assess the role of S100 in GP pathophysiology.

Table 1: Correlations with Inner Layer S100 Levels

<table>
<thead>
<tr>
<th></th>
<th>Mean % Improvement</th>
<th>Standard Deviation</th>
<th>Correlation ( r )</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Score</td>
<td>49.02</td>
<td>31.94</td>
<td>0.71638</td>
<td>0.045592</td>
</tr>
<tr>
<td>Nausea Score</td>
<td>59.75</td>
<td>40.71</td>
<td>0.904374</td>
<td>0.002032</td>
</tr>
<tr>
<td>GI TSS</td>
<td>55.92</td>
<td>29.91</td>
<td>0.811422</td>
<td>0.014484</td>
</tr>
<tr>
<td>Total GCSI</td>
<td>55.20</td>
<td>26.61</td>
<td>0.677468</td>
<td>0.064898</td>
</tr>
</tbody>
</table>
Inner Layer S100 Levels vs. %Improvement in Nausea Score

$r = 0.904, p = 0.002$

Inner Layer S100 Levels vs. %Improvement in TSS

$r = 0.811, p = 0.014$
Inner Layer S100 Levels vs. %Improvement in GCSI Score

$r = 0.677, p = 0.065$

Presented at – Annual Meeting of Digestive Disease Week (DDW) held at Washington, DC in May, 2015
Neuromuscular Evaluation of Drug and Device Refractory Patients with the Symptoms of Gastroparesis Reveals A Variety of Abnormalities

K Soota, C Patel, L McElmurray, A Stocker, M Hughes, A Kedar, V Veda, H Rashed, T Abell

Introduction: Gastroparesis is a complex clinical entity, many aspects of which still remain unknown. Although most patients have idiopathic, diabetic or post-surgical gastroparesis, many are thought to have measurable neuromuscular abnormalities. We conducted an evaluation of drug and/or device refractory patients with the symptoms of gastroparesis to document the degree of neuro-muscular dysfunction.

Patients and Methods: We retrospectively evaluated 37 patients (32 females, 33 Caucasians) with a median age of 42 years. Twenty-three, nine and five patients had drug and/or device resistant idiopathic, diabetic, and post-surgical gastroparesis, respectively. Neuromuscular evaluation included evaluation of paraneoplastic antibodies, glutamic acid decarboxylase (GAD65), full thickness gastric biopsy, Western Blot for autoimmune antibodies (ANABlot) reported as GI Blotting Score (GIBS), and autonomic nervous system assessment (ANS) of adrenergic and cholinergic function along with concomitant enteric nervous system evaluation by electrogastrography (EGG). Twenty-four patients were refractory to previously placed permanent gastric enteral stimulators (GES).

Results: All patients (37/37) had evaluation of paraneoplastic antibodies of which 7 (19%) had detectable titers. 28/37 patients had measurement of GAD65 and it was positive in 5 (18%). 21/37 patients had Western Blot done of which 12 (57%) had GIBS score ≥ 3 (normal <3). 12 patients had ANS assessment performed of which 10 (83%) had abnormal adrenergic response, 5 (42%) had abnormal cholinergic response and 10 (83%) had abnormal EGG. Full Thickness Gastric biopsy was performed in 18 patients. Average number of interstitial cells of Cajal (ICC) as determined by CD117 was 2.07 (normal: 5-6), and only 2 patients had normal levels of ICC. However, 14/18 patients had evidence of immune cells in gastric biopsy, as determined by CD68, at an average of 6.6 immune cells/patient. Median number of neuronal fibers as determined by S100 was 8.55 (Normal: >15).

24 patients had placement of temporary GES followed by a permanent GES. This subgroup of patients (n=23, data missing for 1 patient) showed a good response in symptoms to temporary GES with a p-value of <0.00001 for total symptoms score or TSS but a lack of response to permanent GES with a p-value of 0.73 for TSS (table 2). In contrast, patients without a neuromuscular abnormality, show good response to both temporary and permanent GES (table 2). This lack of response to permanent GES may be a marker of neuromuscular disorder in some of these patients.

Conclusions: In the group of patients who are drug and/or device refractory, a wide variety of neuromuscular abnormalities are detected. Application of neuro-muscular
laboratory evaluation to larger groups of patients with the symptoms of gastroparesis may be warranted.

**Table 1: Baseline Characteristics of patients with neuromuscular evaluation results**

<table>
<thead>
<tr>
<th>Total number of patients, n</th>
<th>37</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, median (years)</td>
<td>42</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>32 (86.5)</td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>5 (13.5)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
</tr>
<tr>
<td>Caucasians, n (%)</td>
<td>33 (89.2)</td>
</tr>
<tr>
<td>African-American, n (%)</td>
<td>1 (2.7)</td>
</tr>
<tr>
<td>Others, n (%)</td>
<td>3 (8.1)</td>
</tr>
<tr>
<td><strong>Diagnosis</strong></td>
<td></td>
</tr>
<tr>
<td>Diabetic gastroparesis, n (%)</td>
<td>9 (24.3)</td>
</tr>
<tr>
<td>Post-surgical gastroparesis, n (%)</td>
<td>5 (13.5)</td>
</tr>
<tr>
<td>Idiopathic gastroparesis, n (%)</td>
<td>23 (62.2)</td>
</tr>
<tr>
<td><strong>Paraneoplastic Antibodies, n</strong></td>
<td>37</td>
</tr>
<tr>
<td>AchR Ganglionic Neuronal Ab, n</td>
<td>3</td>
</tr>
<tr>
<td>Striational (Striated Muscle) Ab, n</td>
<td>2</td>
</tr>
<tr>
<td>P/Q-Type Calcium Channel Ab, n</td>
<td>1</td>
</tr>
<tr>
<td>N-Type Calcium Channel Ab, n</td>
<td>1</td>
</tr>
<tr>
<td><strong>GAD-65, n</strong></td>
<td>28</td>
</tr>
<tr>
<td><strong>ANAblot, n</strong></td>
<td>21</td>
</tr>
<tr>
<td>Positive Abs, n (%)</td>
<td>5 (18)</td>
</tr>
<tr>
<td><strong>ANAblot, n</strong></td>
<td>21</td>
</tr>
<tr>
<td>GIBS ≥ 3, n (%)</td>
<td>12 (57)</td>
</tr>
<tr>
<td><strong>Autonomic Nervous System (ANS) assessment, n</strong></td>
<td>12</td>
</tr>
<tr>
<td>Abnormal Cholinergic response, n (%)</td>
<td>5 (42)</td>
</tr>
<tr>
<td>Abnormal Adrenergic response, n (%)</td>
<td>10 (84)</td>
</tr>
<tr>
<td>Abnormal EGG, n (%)</td>
<td>10 (84)</td>
</tr>
<tr>
<td><strong>Full Thickness Gastric Biopsy, n</strong></td>
<td>18</td>
</tr>
<tr>
<td>Interstitial Cells of Cajal, CD 117</td>
<td>2.07 (normal: 5-6)</td>
</tr>
<tr>
<td>Immune Cells, CD68</td>
<td>6.6</td>
</tr>
<tr>
<td>Neuronal fibers, S100</td>
<td>8.55 (normal: &gt;15)</td>
</tr>
</tbody>
</table>
Table 2: Comparison of the symptom response to GES (temporary and permanent) in patients who underwent neuromuscular evaluation (n=23) and who did not undergo neuromuscular evaluation (n=81)

<table>
<thead>
<tr>
<th></th>
<th>Vomiting</th>
<th>Nausea</th>
<th>Anorexia</th>
<th>Bloating</th>
<th>Abdominal Pain</th>
<th>TSS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (n=23)</td>
<td>2.6</td>
<td>3.4</td>
<td>3.1</td>
<td>2.6</td>
<td>2.9</td>
<td>14.5</td>
</tr>
<tr>
<td>SD</td>
<td>1.7</td>
<td>0.96</td>
<td>1.1</td>
<td>1.4</td>
<td>1.4</td>
<td>4.3</td>
</tr>
<tr>
<td><strong>Temporary Pacemaker</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (n=23)</td>
<td>0.8</td>
<td>1.7</td>
<td>1.3</td>
<td>0.95</td>
<td>1.7</td>
<td>6.1</td>
</tr>
<tr>
<td>SD</td>
<td>1.2</td>
<td>1.5</td>
<td>1.5</td>
<td>1.4</td>
<td>1.7</td>
<td>5.5</td>
</tr>
<tr>
<td>p-value (baseline vs temp)</td>
<td>0.0004</td>
<td>0.00004</td>
<td>0.00007</td>
<td>0.0003</td>
<td>0.017</td>
<td>0.00001</td>
</tr>
<tr>
<td><strong>Post-Permanent Pacemaker</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (n=23)</td>
<td>1.6</td>
<td>3.3</td>
<td>3</td>
<td>2.8</td>
<td>3.3</td>
<td>14.1</td>
</tr>
<tr>
<td>SD</td>
<td>1.5</td>
<td>0.8</td>
<td>1.1</td>
<td>1.2</td>
<td>1.1</td>
<td>4</td>
</tr>
<tr>
<td>p-value (permanent vs baseline)</td>
<td>0.08</td>
<td>0.78</td>
<td>0.75</td>
<td>0.60</td>
<td>0.41</td>
<td>0.73</td>
</tr>
<tr>
<td>p-value (permanent vs temporary)</td>
<td>0.07</td>
<td>0.0002</td>
<td>0.0005</td>
<td>0.0001</td>
<td>0.002</td>
<td>0.00001</td>
</tr>
<tr>
<td>Mean (N=81)</td>
<td>2.472</td>
<td>3.389</td>
<td>3.204</td>
<td>3.037</td>
<td>3.105</td>
<td>15.194</td>
</tr>
<tr>
<td>SD</td>
<td>1.497</td>
<td>0.929</td>
<td>1.006</td>
<td>1.193</td>
<td>1.227</td>
<td>3.748</td>
</tr>
<tr>
<td><strong>Temporary Pacemaker</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean (N=81)</td>
<td>0.414</td>
<td>1.457</td>
<td>1.488</td>
<td>1.340</td>
<td>1.512</td>
<td>6.160</td>
</tr>
<tr>
<td>SD</td>
<td>0.832</td>
<td>1.225</td>
<td>1.378</td>
<td>1.403</td>
<td>1.456</td>
<td>5.081</td>
</tr>
<tr>
<td>t Test vs Baseline</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
<td>0.000000</td>
</tr>
<tr>
<td><strong>Post-Permanent Pacemaker</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.401</td>
<td>2.522</td>
<td>2.253</td>
<td>2.235</td>
<td>2.494</td>
<td>10.907</td>
</tr>
<tr>
<td>SD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------</td>
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<td>-------</td>
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<td>-------</td>
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<td>-------</td>
</tr>
<tr>
<td>t Test vs Baseline</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0001</td>
<td>0.00409</td>
<td>0.0000</td>
</tr>
<tr>
<td>t Test vs Temp</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0005</td>
<td>0.0000</td>
<td>0.00003</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

*Presented at – Annual Meeting of Digestive Disease Week (DDW) held at Washington, DC in May, 2015*
Door-to-Diuretic Time: A Promising Strategy for Improving Delivery of Care to Patients Hospitalized with Decompensated Heart Failure, a Community-based Single Center Experience

Vasvi Singh MD, Saurav Luthra MD, Varda Singhal MD, Neelima Divakaran MD, Arnel Magno MD, Mahesh Krishnamurthy MD, Ruth Kouides MD, MPH

Purpose of research: Congestive Heart failure (CHF) is a major and growing threat to public health and optimizing patient outcomes will become increasingly important as population of United States ages. We hypothesized that Emergency Department (ED) provider education along with HF tailored Electronic Health Record (EHR) order sets would result in prompt delivery of intravenous loop diuretic in appropriate doses and improve patient outcomes.

Methods: As a part of CHF Quality Improvement Project, we implemented two sequential interventions in the ED. Demographic and CHF management data were collected before any intervention (Period 1: January, February and March of 2012), after an ED provider education program (Period 2: January, February and March of 2013), and after introducing CHF specific physician order entry sets (Period 3: January, February and March of 2014). Each data collection period was of 3-month duration. Evidence based education about CHF included 1) administering the first dose of loop diuretic within 120 minutes of patient registration and 2) giving an initial dose intravenously at 1.5 to 2 times the daily home dose. We compared Door-to-Order (registration to provider order) and Door-to-Diuretic (registration to drug administration to patient) times as well as the appropriateness of dosing in each period. The length of stay (LOS) and 1-month CHF readmission rates for each period were also analyzed.

Results: We had 93, 71, and 103 patients during Periods 1, 2, and 3 respectively. There was no difference in the median age or sex distribution by period. The median (IQR) Door-to-Order time in minutes improved significantly (Period 1: 180 (95, 318), Period 2: 140 (81, 238), Period 3: 134 (60, 204), p=0.006). The median (IQR) Door-to-Diuretic time in minutes also decreased significantly (Period 1: 214 (140, 373), Period 2: 181 (110, 274), Period 3: 157 (84, 245), p=0.007). There was no change in Order-to-Diuretic delivery time, appropriate dosing rates, or effect on LOS. There was a trend towards decreased 1-month CHF readmission rate (Period 1: 12%, Period 2: 13%, and Period 3: 5%).

Conclusions: Implementation of ED provider education program and CHF specific order sets resulted in improving physician promptness in ordering diuretics (Door-to-Order time) and ultimately timely diuretic administration to HF patients (Door-to-Diuretic time). Additional education is needed for appropriate evidence-based diuretic dosing. Further studies, on a larger population will be required to determine whether the intervention results in improved CHF outcomes in the form of reduced LOS and CHF readmission rate.

Presentation at AMA 2014
Accuracy of Computer Interpretation of Electrocardiographic Exercise Stress Tests

Vasvi Singh MD, Saurav Luthra MD, Ruth Kouides MD, Ryan Hoefen MD

Background: Computerized analysis of ST segment deviation provides a convenient method for rapid interpretation of electrocardiograms recorded during exercise stress testing that may reduce inter-reader variability and perhaps improve accuracy through beat-to-beat averaging. The accuracy of computer interpretation of ECG exercise stress test has not been explored systematically. This study was done to determine if the computer interpretation would enhance the cardiologist’s interpretation of exercise stress tests.

Methods: A cohort of 92 consecutive patients who underwent exercise stress echocardiograms at a community hospital was studied. The computer interpretation was analyzed from the Median Report of maximum ST deviations. Positive tests were defined based on the degree of ST depression, depending on ST segment slope, and the total number of leads with ST depression. For ST segments with a slope <=0.6 (“Non-sloping”), we had cut point of 1 mm beyond the J point. For ST segments with a slope >0.6 (“Sloping”), we analyzed cut points of 1.5 and 2.0 mm. We defined 4 categories with varying degrees of stringency: 1) “Loose Criteria”- considered positive if >=1mm “Non-sloping” OR >= 1.5mm of “Sloping” ST depression in >=2 leads; 2) “Medium Lead Criteria”- considered positive with the same voltage criteria as above but with ST depression in >=3 leads; 3) “Medium Voltage Criteria” – considered positive if >=1mm “Non-sloping” OR >= 2.0 mm of “Sloping” ST depression in >=2 leads; 4) “Strict Criteria” – considered positive if >=1mm “Non-sloping” OR >= 2.0 mm of “Sloping” ST depression in >=3 leads. Using the cardiologist’s ECG read as the gold standard, we calculated the sensitivity, specificity, positive and negative predictive values.

Results: There were a total of 92 patients included, consisting of 45.6% males and 54.4% females. The mean age was 53.6 (± 13.7) years with a range of 26 to 90 years. By cardiologist ECG interpretation, 9.8% of our population had a positive stress test. The percentage of positive computer interpretations by the 4 criteria were as follows: Loose criteria - 38%, Medium Lead Criteria - 29.3%, Medium Voltage Criteria - 22.8%, and Strict Criteria - 19.6%. Diagnostic accuracy of computer interpretation based on all 4 criteria versus the cardiologist (gold standard) is shown in Table 1.
Table 1: Cardiologist versus computer interpretation based on all 4 criteria

<table>
<thead>
<tr>
<th></th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>NPV</th>
<th>PPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose</td>
<td>55.6% (22.7-84.7)</td>
<td>63.9% (52.5-73.9)</td>
<td>93.0% (82.2-97.7)</td>
<td>14.3% (5.4-31.0)</td>
</tr>
<tr>
<td>Medium-Lead</td>
<td>44.4% (15.3-77.3)</td>
<td>72.3% (61.2-81.3)</td>
<td>92.3% (82.3-97.1)</td>
<td>14.8% (4.9-34.6)</td>
</tr>
<tr>
<td>Medium-Voltage</td>
<td>33.3% (9.0-69.1)</td>
<td>78.3% (67.7-86.3)</td>
<td>91.5% (81.9-96.5)</td>
<td>14.3% (3.8-37.4)</td>
</tr>
<tr>
<td>Strict</td>
<td>33.3% (9.0-69.1)</td>
<td>81.9% (71.6-89.2)</td>
<td>91.9% (82.6-96.7)</td>
<td>16.7% (4.4-42.3)</td>
</tr>
</tbody>
</table>

Echocardiography confirmed a new wall motion abnormality in only 1 patient in this study, who’s ECG, demonstrated ischemic changes by cardiologist read (negative by computer interpretation). His cardiac catheterization was normal. Cardiac catheterization was performed in 3 patients (3.3%), of which, only one was found to have coronary artery stenosis. The patient found to have coronary stenosis had a positive ECG stress test by both computer (using all criteria evaluated) and cardiologist interpretation. Of the two patients who underwent coronary angiography and found to have normal coronary arteries, one had a positive stress ECG as read by computerized evaluation and cardiologist; and the other was positive by cardiologist interpretation but negative by computer evaluation.

**Conclusion:** We have evaluated the accuracy of computerized ECG interpretation of stress test results using cardiologist ECG interpretation as the gold standard. The sensitivity varied from 33.3% to 55.6% with the highest sensitivity with the Loose Criterion as expected. The specificity varied from 63.9 to 81.9%. The highest NPV was 93.0% with the Loose Criterion, but missing 7% of the disease is not acceptable and we cannot rely on the computer as a screening test to determine the need for a cardiologist review. The study was performed retrospectively and the cardiologists reading the tests were not aware that comparison with the computer would be performed. They had the computerized measurement of ST deviation available as they interpreted the test, but a survey of the cardiologists involved showed that they did not review those results. The prevalence of positive stress tests (9.8%) and angiographically proven coronary stenosis (1.1%) were low indicating this is a low risk population. The sensitivity and specificity of the computer read was not helpful in our setting, but the diagnostic performance on a higher risk population is unknown. Future research may include improvement in computerized algorithms and testing in a higher risk population.

*Presented at Strong Memorial Hospital Annual Poster Symposium, University of Rochester, Rochester, NY in Oct 2014*

*Awarded 3rd prize in Research category*
PERSONALIZED PATIENT EDUCATION HANDOUTS IMPROVE UNDERSTANDING OF HEALTH STATUS AND MOTIVATION

Vasvi Singh MD; Saurav Luthra MD; Ruth Kouides MD; Nathan Ritter MD, Ryan Hoefen MD

Purpose of Study: Nearly 40% of mortality in the United States is related to social and behavioral factors such as smoking, diet and sedentary lifestyle. Research demonstrates increased motivation when individuals perceive greater autonomy, competence and relatedness to a goal. We hypothesized that giving patients a personalized handout with educational information tailored to their health data would result in a more accurate sense of their health status and opportunities for improvement, thereby increasing their motivation to engage in healthier lifestyle habits.

Methods: After IRB approval, consecutive presenting to a cardiology office were asked to participate and those who agreed were given a pre-visit survey to gauge perceptions of their health status and motivation to make behavior changes. Alternate subjects were assigned to the Experimental and Control groups. Experimental Subjects were given a personalized health summary with graphics indicating current risk factor status and short text summaries with advice on health improvement. These summaries were generated based on basic patient characteristics (age, height, weight, blood pressure, smoking status, lipid levels, fasting plasma glucose, kidney function, diet and activity level) and were reviewed with the cardiologist during the visit. The Control subjects had a routine office visit and were given standard patient education handouts at the physician’s discretion. At the end of their visit, all subjects received a post-visit survey to assess changes in health perceptions and motivation.

Results: 77/79 patients agreed to participate and completed pre-visit and post-visit surveys. The Experimental Group (N=39) and Control Group (N=38) had mean ages (+/-SD) of 66.6 (+/-15.2) years and 64.2 (+/-12.8) years (p=0.46), and female percentage of 35.9% and 71.0% (p<0.01), respectively. Subjects who received personalized handouts changed their responses to more questions regarding their current health status than those with routine office visits (28.4% vs. 12.3%, p<0.01) suggesting they gained a more accurate insight into their health. On questions regarding ‘perceptions of health’, 31.6% of Experimental vs. 14.9% of Control group (p<0.01) changed responses. On questions regarding ‘motivation to improve health’, Experimental Subjects were also more likely to indicate increased motivation following their office visit (30.5% vs. 12.8%, p<0.01), as well as improved knowledge on how to improve their health (26.8% vs. 11.1%, p<0.01).
Conclusions: Use of a personalized patient education handout resulted in more accurate health perception, increased motivation to make healthy changes, and a better knowledge of how to go about making those changes. Further studies will be needed to determine whether the intervention results in behavior change and improved health outcomes.

Presented at NYACP 2014 (New York chapter of American College of Physicians) in September 2014
Awarded 3rd prize in resident/fellow Research category
64-detector CT angiography within 24 hours after carotid endarterectomy and correlation with postoperative stroke

Gallati CP, Jain M, Damania D, Kanthala AR, Jain AR, Koch GE, Kung NT, Wang HZ, Replogle RE, Jahromi BS.

Abstract

OBJECT: Carotid endarterectomy (CEA) carries a small but not insignificant risk of stroke/transient ischemic attack (TIA), most frequently observed within 24 hours of surgery, which can lead to the need for urgent vascular imaging in the immediate postoperative period. However, distinguishing expected versus pathological postoperative changes may not be straightforward on imaging studies of the carotid artery early after CEA. The authors aimed to describe routine versus pathological anatomical findings on CTA performed within 24 hours of CEA, and to evaluate associations between these CTA findings and postoperative stroke/TIA.

METHODS: The authors reviewed 113 consecutive adult patients who underwent postoperative CTA within 24 hours of CEA at a single academic institution. Presence and location of arterial "flaps," luminal "step-off," intraluminal thrombus and hematoma were documented from postoperative CTA scans. Medical records were reviewed to determine the incidence of new postoperative neurological findings.

RESULTS: Postoperative CTA findings included common carotid artery (CCA) step-off (63.7%), one or more intraarterial flaps (27.4%), hematoma at the surgical site (15.9%), and new intraluminal thrombus (7.1%). Flaps were seen in the external carotid artery (ECA), internal carotid artery (ICA), and CCA in 18.6%, 9.7%, and 6.2% of patients, respectively. New postoperative neurological findings were present in 7.1% of patients undergoing CTA. Flaps (especially ICA/CCA) and/or intraluminal thrombi were more frequently seen in patients undergoing CTA for new postoperative stroke/TIA (85.7%) versus patients undergoing CTA for routine postoperative imaging (14.3%, p = 0.002).

CONCLUSIONS: CTA within 24 hours of CEA demonstrates characteristic anatomical findings. CCA step-offs and ECA flaps are relatively common and clinically insignificant, whereas ICA/CCA flaps and thrombi are less frequently seen and are associated with postoperative stroke/TIA.

Does prolonged length of stay in the emergency department affect outcome for stroke patients?

Jain M, Damania D, Jain AR, Kanthala AR, Ganti L, Jahromi BS.

Abstract

INTRODUCTION: Conflicting data exist regarding the association between the length of stay (LOS) of critically ill patients in the emergency department (ED) and their subsequent outcome. However, such patients are an overall heterogeneous group, and we therefore sought to study the association between EDLOS and outcomes in a specific subgroup of critically ill patients, namely those with acute ischemic stroke/transient ischemic attack (AIS/TIA).

METHODS: This was a retrospective review of adult patients with a discharge diagnosis of AIS/TIA presenting to an ED between July 2009 and February 2010. We collected demographics, EDLOS, arrival stroke severity (National Institutes of Health Stroke Scale - NIHSS), intravenous tissue plasminogen activator (IV tPA) use, functional outcome at discharge, discharge destination and hospital-LOS. We analyzed relationship between EDLOS, outcomes and discharge destination after controlling for confounders.

RESULTS: 190 patients were included in the cohort. Median EDLOS was 332 minutes (Inter-Quartile Range -IQR: 250.3-557.8). There was a significant inverse linear association between EDLOS and hospital-LOS (p=0.049). Patients who received IV tPA had a shorter median EDLOS (238 minutes, IQR: 194-299) than patients who did not (median: 387 minutes, IQR: 285-588 minutes; p<0.0001). There was no significant association between EDLOS and poor outcome (p=0.40), discharge destination (p=0.20), or death (p=0.44). This remained true even after controlling for IV tPA use, NIHSS and hospital-LOS; and did not change even when analysis was restricted to AIS patients alone.

CONCLUSION: There was no significant association between prolonged EDLOS and outcome for AIS/TIA patients at our institution. We therefore suggest that EDLOS alone is an insufficient indicator of stroke care in the ED, and that the ED can provide appropriate acute care for AIS/TIA patients. [West J Emerg Med. 2014;15(3):267-275.].

Increased Normalcy Rate with Computed Tomography Attenuation Correction in Single Positron Emission Computed Tomography Myocardial Perfusion Imaging – Is it Useful?
Lalit Wadhwani MD, Tarun Tandon MD

Background: Soft tissue attenuation, motion artifacts and Compton scatter negatively affect the quality of Single Photon Emission Computed Tomography (SPECT) Myocardial Perfusion Imaging (MPI). Computed Tomography Attenuation Correction (CT-AC) is useful in recognizing whether the tracer deficit is due to diminished myocardial perfusion or due to motion or attenuation artifact. Current literature suggests that attenuation correction improves the diagnostic accuracy of MPI for coronary artery disease (CAD). We evaluated the normalcy rates and the rate of coronary angiograms in two groups of patients who underwent MPI with and without CT-AC respectively.

Methods: A retrospective analysis of 610 patients who underwent Technetium-99m sestamibi stress MPI for assessment of suspected myocardial ischemia was performed. The patients were divided into two groups of 305 each. The first group underwent SPECT MPI with CT-AC and the second group without CT-AC. All images were interpreted by a group of four cardiologists. Images suggestive of ischemia, infarct or ischemia and infarct both, were considered abnormal. The number of patients who underwent angiogram based on MPI result was noted and the angiogram data was further evaluated. The patients who were found to have at least 50% stenosis in any of the coronary artery were considered to have CAD.

Results: Interpretation of images with CT-AC revealed that 74.75%(228/305) of scans were read as normal whereas only 49.84%(152/305) of the scans were read as normal in the group without CT-AC. The number of normal results was significantly higher in the CT-AC group (P < 0.01). 10.82% (33/305) patients in the CT-AC group underwent angiogram after the SPECT MPI compared to 10.16% (31/305) patients in the group without CT-AC. Based on the angiogram data, the sensitivity of SPECT MPI decreased from 95.45% to 81.25% but the specificity increased from 11% to 41% with the addition of CT-AC.

Conclusion: In our study, the normalcy rate of SPECT MPI was significantly higher in the CT-AC group. Addition of CT-AC increased the specificity and decreased the sensitivity of SPECT MPI as proven by trials in the past. Contrary to the assumption that it will decrease the number of angiograms, addition of CT-AC led to an increase in the number of angiograms.

Presented at RGH Poster Day on May 21, 2015
RATE OF OSTEOPOROSIS SCREENING IN MEN VS WOMEN IN AN OUTPATIENT INTERNAL MEDICINE CLINIC

Amer Issa MD, Mohamad Tarazi MD, Leela Mary Mathew MD

Abstract

Background:

Osteoporosis affects 10 million Americans and causes 1.5 million fractures with a direct cost of 20 billion dollars a year. It is a silent disease until complicated by a fracture. One in two women and one in five men will suffer an osteoporotic fracture in their lifetime.

The National osteoporosis foundation (NOF) clinical guidelines recommend bone density screening (DEXA scan) in women at age 65 and men at age 70 in average risk individuals.

The objective of this study is to assess the adherence to these recommendations in an academic longitudinal outpatient Internal Medicine clinic at Unity Health System in Rochester, NY.

Methods:

All males aged 70-85 and females 65-85 years of age were included. The clinic is a Resident run, Faculty supervised setting.

All available medical records were reviewed for documentation of DEXA screening; through radiology reports, progress and consultation notes and previous medical records. Risk factors for osteoporosis other than age were identified, ie fractures, chronic steroids use and hypogonadism.

Results:

The study included 454 patients, 290 females (64%) and 164 males (36%). Documentation for osteoporosis screening was found in 136 females (47 %) as compared to 11 males (6.5 %). All 11 (100%) of screened men had identified risk factors other than age. In contradistinction, only 15 women (10.5 %) screened had risk factors other than age. Age remained the mainstay of screening in women (90 %).

Discussion:

There is limited data regarding average screening rate in men. In 2008, the American College of Physicians (ACP) identified osteoporosis as an underreported disease in men and called for improvement in the rates of diagnosis. Osteoporosis is universally viewed as a women’s disease and data shows that while women perceive osteoporosis as a serious disease, men perceive it as a women’s disease. Our study shows a dismal rate of screening in men and done only when other risk factors were identified.
Despite coverage under Medicare, bone density tests are grossly underutilized. In 2005, an estimated 30% of women and 4% of men on Medicare received the DEXA scan. A 2006 cross sectional study in a family practice setting showed that 50% of women aged >65 had received a DEXA scan.

**Conclusion:**

There continues to be a major gap in the quality of care in bone health provided, especially among men. Public education and awareness remains key in closing this gap. On the medical side, performance improvement measures, EMR screening reminders and patient education at point of care needs to be reinforced and included as part of a Quality measure.

- Presented at AACE (American Association of Clinical Endocrinologists) annual meeting Nashville, Tennessee 2015
Epidermoid Cyst of Intra-Pancreatic Accessory Spleen – A Diagnostic Dilemma

Sharma S., MBBS; Soota K., MD; Abdalla M., MD; Wang G., MM; Zhou Z., B Med, PhD; Shah A., MD; Kothari S., MD; Kaul V., MD

Introduction: Epidermoid cyst of intra-pancreatic accessory spleen (IPAS) is a rare diagnosis with only 32 cases reported in the literature. We present the case of a 39 year old male who underwent distal pancreatectomy for presumed intra-ductal pancreatic mucinous neoplasm (IPMN) that was diagnosed to be an epidermoid cyst of IPAS.

Case: A 39 year old male with history of alcohol abuse was admitted to the hospital with complaints of abdominal pain, nausea, vomiting and intermittent hematochezia associated with weight loss of 20 pounds in 2 months. Abdominal CT scan showed a 2cm x 1.9cm, well circumscribed cystic mass in the pancreatic tail (Image, panel A). Endoscopic ultrasound (EUS) also showed a cystic lesion in pancreatic tail (Image, panel B). Fine needle aspiration cytology (FNA) revealed a few “atypical” cells with intra and extracellular mucin. Cyst fluid CEA level of 10,460ng/ml was noted, concerning for a mucinous neoplasm. The patient underwent distal pancreatectomy and splenectomy. However, pathology revealed epidermoid cyst of intrapancreatic accessory (heterotopic) spleen with low grade pancreatic intraepithelial neoplasia.

Discussion: Epidermoid cyst of IPAS was first reported by Davidson et al in 1980. It is believed that some unidentified genetic and/or environmental factors might play a role in its development as most of these cases have been reported from the Asian community. It is commonly found in adults in the age group of 40-70 years and does not seem to carry any gender predilection. Clinically, patient is asymptomatic, and the lesions in found incidentally on abdominal imaging. It can easily mimic other pancreatic lesions including pre-malignant lesions like IPMN and mucinous cysts, as was the case in our patient. CT, MRI and EUS-FNA are helpful but it can be difficult to establish an accurate diagnosis without gross pathology from a resected specimen obtained surgically. Epidermoid cyst of IPAS is a rare entity, but should be kept in mind in the differential diagnosis of cystic pancreatic lesions, particularly as it carries an excellent prognosis.

Conclusion: Epidermoid cyst of IPAS is a benign lesion found incidentally on abdominal imaging and is difficult to diagnose without pathology obtained from surgical resection. It is a benign entity and patients should be reassured about the good prognosis. This is the 5th reported case of such a lesion from the western part of the world.

Presented at – Annual Meeting of American College of Gastroenterology (ACG) held at Philadelphia in 2014
Occult GI bleeding (OGIB) can be caused by several different mechanisms. We present a case of a 71 year old female who presented with OGIB and symptomatic anemia from an iatrogenic foreign body which was implanted iatrogenically more than 5 years ago.

**Case:** A 71 year old female with history of cholecystectomy and umbilical hernia repair with mesh placement was seen for complaints of light headedness. She was found to have iron deficiency anemia with hemoglobin (Hb) of 7.4gm/dl and guaiac positive stools. Her Hb was 11gm/dl three months ago. To evaluate the cause of anemia she underwent esophagogastroduodenoscopy (EGD) and colonoscopy, none of which revealed the source of bleeding. She continued to have symptomatic anemia requiring packed red blood cell transfusions. Video capsule endoscopy (VCE) was performed next which showed a 1-2 cm small bowel lesion with ulceration. Further, CT scan of abdomen showed a 4.5 cm long foreign body which was not visualized on a previous CT scan 3 months ago. This prompted surgical evaluation and she underwent diagnostic laparoscopy followed by an exploratory laparotomy. Laparotomy revealed a mesh that had eroded into the small bowel lumen. Small bowel resection was performed and the mesh was removed with it. Surgical pathology disclosed a 4x3.8 cm sized mesh which invaded into the lumen of the bowel extending out of it into other areas. She was placed on iron supplements and her Hb is 11gm/dl, six months after the surgical repair.

**Discussion:** OGIB can sometimes be easy to manage with iron supplements but more often it poses a challenge to ascertain the cause which can be challenging at times. The most common causes of OGIB are angiectasias in older population and tumors (eg. leiomyoma, lymphoma, etc.) in younger patients (<50 years old)1. Foreign body ingestion which includes retained VCE can sometimes be the culprit; however, history can be the diagnostic clue in these cases. Mesh erosion and migration are rare complications of hernia repair and can happen weeks to years after the surgery. In such cases surgical management with bowel resection and removal of the mesh is necessary. Our patient had a mesh placed during her umbilical hernia repair ___ years ago which eroded into the small bowel resulting in chronic blood loss which manifested as symptomatic anemia.

**Conclusion:** Mesh erosion is a rare cause of OGIB, which can pose a diagnostic challenge and hindering a definitive management. Appropriate history and imaging such as CT scan can provide important clues2. To our knowledge, this is one of the few cases of OGIB secondary to small bowel erosion due to a mesh placed in a previous surgery.

*Presented at – Annual Meeting of American College of Gastroenterology (ACG) held at Philadelphia in 2014*
A Case of Varicella Zoster Hemorrhagic Gastritis

Kaartik Soota, Brandon Sprung, Aaron Huber, Thomas Werth

Abstract

**Purpose:** Hemorrhagic gastritis secondary to Varicella Zoster Virus (VZV) is rarely identified in immunocompromised patients, and we report such a case from our experience.

An 82 year old female with chronic lymphoid leukemia receiving chemotherapy, presented with one week of anorexia, abdominal pain, nausea and vomiting. Lab evaluation was significant only for thrombocytopenia, and abdominal CT scan was unrevealing. Her symptoms persisted despite hydration and pain control, and on hospital day 5 she developed worsening thrombocytopenia with transaminemia and leukocytosis. Viral hepatitis panel including HSV, CMV and EBV was negative, as was an abdominal ultrasound with doppler. An upper endoscopy performed to evaluate her symptoms revealed small, hemorrhagic, irregular shallow ulcerations and erosions throughout the stomach (Image A). A diffuse vesicular rash developed on hospital day 10, and acyclovir was initiated empirically. Multi-organ failure rapidly ensued, and care was withdrawn. The endoscopic biopsies later revealed epithelial hemorrhage, ischemia and nuclear viral inclusions with a strongly positive immunohistochemical stain for VZV, consistent with acute hemorrhagic gastritis due to VZV (Image B). Viral swab of a skin lesion was positive for VZV by PCR.

**Discussion:** To our knowledge, this is one of a few cases of VZV hemorrhagic gastritis confirmed by endoscopic biopsy and PCR of cutaneous lesions. Reactivation of VZV is common in immunocompromised patients, usually presenting as a cutaneous eruption of vesicles. Rarely, visceral and gastric involvement can occur, usually concurrent with a hematologic malignancy and disseminated cutaneous involvement. The vesicular eruption can be absent initially and be first observed up to 10 days after abdominal symptoms develop. Presentation of visceral VZV is non-specific and may be characterized by nausea, vomiting, and abdominal pain with possible development of gastrointestinal hemorrhage, pancreatitis and hepatitis. While endoscopic evaluation is often unrevealing, gastrointestinal mucosal involvement can occur in the form of gastric ulcerations or punctate hemorrhages. Treatment is with antivirals. A high clinical suspicion is important to recognize this condition early in the proper clinical setting, as mortality rate can be 40-50%.
A. Hemorrhagic, ecchymotic shallow ulcerations and erosions with exudate.
B. Immunohistochemical stain for VZV demonstrates diffuse and strong positivity within viral inclusions.

*Presented at – Annual Meeting of American College of Gastroenterology (ACG) held at Philadelphia in 2014*
A RARE CASE OF HYPERAMMONEMIC ENCEPHALOPATHY SECONDARY TO VALPROATE TOXICITY

Saurav Luthra MD; Vasvi Singh MD; Carlos Palacio MD

Introduction: Valproic acid (VPA) indirectly increases the amount of gamma-aminobutyric acid (GABA) available to the central nervous system (CNS). It also alters fatty-acid metabolism, impairs mitochondrial beta-oxidation, and disrupts urea cycle that leads to hyperammonemia. We present here our experience of managing a rare case of hyperammonemic encephalopathy from VPA overdose.

Case Description: A 38 year old male with bipolar disorder and presently going through marital problems was found on the floor of his father’s basement unresponsive, with an empty bottle of VPA next to him. It was filled 1 week ago with 60 tablets. On admission, vitals were notable for an oral temperature of 36.1 degree Celsius. He was unconscious, minimally responsive to noxious stimuli and pupils were pinpoint. Cardiopulmonary, abdominal and skin exam were normal. Labs were notable for mixed high anion gap metabolic acidosis and respiratory acidosis. Urine toxicology screen was positive for cocaine, ETOH level was 0.03, and acetaminophen and salicylate levels were negative. VPA level on admission was 1463 mg/L (normal: 50-100 mg/L) and serum ammonia was 263 mcg/dL (normal: 28-80 mcg/dL).

Chest X-ray and Non-contrast CT head were normal. He was intubated in the intensive care unit (ICU) for airway protection, and received levocarnitine therapy and emergency hemodialysis the same day as recommended by the poison control. Post-dialysis, VPA level came down to 250 mg/L and then 125 mg/L on day 2. Ammonia levels also normalized. Patient was extubated on day 3 and discharged to inpatient psychiatry after 5 days of ICU stay.

Discussion: Severe VPA poisoning may present with hypothermia, refractory hypotension, confusion, lethargy, hallucinations and coma, along with dose dependent respiratory depression that may require mechanical ventilation. Hyperammonemic encephalopathy is an unusual complication and results from inhibition of carbamoyl phosphate synthetase-I that begins the urea cycle. Hyperammonemia leads to increased brain glutamine level that causes astrocyte swelling and cerebral edema. Management is mainly supportive. Decontamination and elimination may be required. Hemodialysis decreases VPA levels and should be initiated promptly when levels exceed 850-1000 mg/L. Long-term use of VPA is associated with serum carnitine depletion, which leads to hyperammonemia. Carnitine also plays a direct role in metabolism and elimination of VPA. Levocarnitine supplementation is believed to provide benefit in VPA toxicity, particularly with concomitant hyperammonemia, encephalopathy, or hepatotoxicity. It is best administered in consultation with a poison control center for dosing recommendations. More experience is needed before levocarnitine use for valproate toxicity becomes a standard of care. This case is unique; with remarkably high levels of acute VPA toxicity that responded very well to our
therapy of intensive supportive care, emergent hemodialysis and levocarnitine therapy, and will add to the knowledge to other physicians facing similar presentation.

*Presented at National ACP 2015*
Case Presentation: A 23 year old male presented to the emergency department with left sided pleuritic chest pain radiating to the back, mild cough, clear sputum and shortness of breath for 2 days. He had a history of alcohol abuse related acute pancreatitis one year ago and had another episode of pancreatitis with infected pseudocysts 2 months back. He denied any abdominal pain, nausea, vomiting, fever or chills. Lab work revealed lipase of 190 u/L and amylase of 390 u/l. Chest CT scan showed a new large left-sided pleural effusion, and the pseudocysts surrounding the pancreas had decreased in size when compared to the previous CT scan 2months ago. Thoracentesis was done, draining 1000 cc of brownish-red exudative fluid having an amylase level of 18425 u/L, which revealed the uncommon diagnosis of a pancreatico-pleural fistula (PPF). Magnetic Resonance Cholangiopancreatography (MRCP) was also performed that reported collapsed pancreatic duct with no necrotizing pancreatitis, smaller pseudocysts with a larger collection remaining in the left anterior abdomen and normal biliary structures. A second thoracentesis 2 days later showed a rapidly increasing amylase level of 27380 u/L. Given his ongoing symptoms and recurrent pleural effusions, he was transferred to a pancreatico-biliary center where he was treated with pancreatic stent placement, Percutaneous Endoscopic Gastrostomy (PEG) tube insertion, pleural catheter placement for continued drainage and Endoscopic Ultrasound (EUS) guided cysto-gastrostomy double stents placement. Follow up CT scan of the abdomen showed near resolution of the abdominal fluid collection in the lesser sac and interval decrease in collection size in left upper quadrant. He was discharged home after a few weeks.

Discussion: Pancreatico-pleural fistula can be rare complication of pseudocysts, which can be very challenging to manage. Use of amylase level in pleural fluid analysis is helpful in making a diagnosis. MRCP is the initial imaging modality of choice to confirm the presence of PPF. Treatment may be conservative but in some cases drainage of the pseudocysts may be required by surgical or endoscopic measures. 

Conclusions: Massive pleural effusion in a patient with pancreatic pseudocyst is a rare but serious complication. It may arise from a direct connection between the pseudocyst and the pleural cavity via a PPF. Rarely, this may be the primary presentation of a pseudocyst that can make it a diagnostic challenge leading to management difficulties. We have reported here a rare case of PPF presenting as a large unilateral pleural effusion, managed by endoscopic cysto-gastrostomy which is associated with less morbidity as compared to conventional surgical options.

Presented at SHM 2015
THE POISONOUS PUMP THAT FROZE A BRAIN, LITERALLY!

Saurav Luthra MD1, Vasvi Singh MD1, Carlos Palacio MD1

Introduction: Baclofen, a centrally acting skeletal muscle relaxant is primarily used to treat severe spastic conditions. It is available as oral and intrathecal formulations. Baclofen overdose commonly occurs with intentional ingestions or intrathecal pump malfunctions. Latter has been reported only as case reports but its presentation mimicking sepsis is not documented.

Case Presentation: A 39-year-old female on intrathecal baclofen pump for advanced Multiple Sclerosis (MS) presented to Emergency Department (ED) with acute onset, progressive confusion and drowsiness. Vital signs were significant for an oral temperature of 34.8 °C. Pertinent physical exam findings included reactive and dilated pupils, flaccid extremities (baseline), normal cardio-pulmonary and abdominal exam. Labs including a complete blood count with differential, comprehensive metabolic panel, lactic acid, arterial blood gas and urine toxicology screen were normal. Urinalysis suggested an infection. Chest X-ray was normal and CT scan of head showed stable MS lesions. She became hypotensive despite adequate fluid resuscitation and was transferred to Intensive Care Unit (ICU) with the impression of severe urosepsis. She was treated with broad spectrum antibiotics, high dose steroids (for possible MS flare) and vasopressors. Despite aggressive therapy for 24 hours, she remained hypothermic, hypotensive and subsequently developed bradycardia (40-50 bpm). Further information with spouse arrival, disclosed a 20% increase in baclofen pump dose, 2 days prior to admission. At this time, an MS flare was unlikely given her advanced disease, as was sepsis because she was worsening despite adequate therapy. On day 3, heart rate (HR) dropped to 30bpm with brief pauses. With a strong suspicion of baclofen toxicity, its dose was decreased by 20% and within minutes HR improved to 70bpm. Acute encephalopathy started resolving with additional 50% dose reduction. Antibiotics and steroids were discontinued, and she was discharged home eventually.

Discussion: Severe baclofen toxicity may present with bradycardia, hypotension, respiratory failure, hypothermia, seizures, coma and death. Rarely, status epilepticus, rhabdomyolysis, and cardiac conduction abnormalities occur. Management is mainly supportive; activated charcoal is used in acute ingestions and pump reservoirs emptied following intrathecal overdose. Treatment should be initiated based on clinical suspicion as urine toxicology does not screen baclofen and serum concentrations are not readily available. This is a rare case of iatrogenic baclofen overdose presenting as acute encephalopathy with refractory hypotension, hypothermia and severe bradycardia, initially mimicking as sepsis. Physicians need to maintain a high suspicion of toxicity in patients having intrathecal baclofen pumps for prompt diagnosis and treatment.

Presented at AMA 2014
The Game is not All About the Ball: A Case of Chronic Necrotizing Aspergillosis

Quintos A, Samudrala G, Fayyaz J

Background: The differential diagnoses for cavitary lung lesions is broad, and include pyogenic lung abscess, tuberculosis, aspergillosis, and malignancy, among others. We present a case of cavitary lung lesions in a patient on chronic immunosuppressive therapy.

Case Presentation: A 48-year-old woman with Rheumatoid arthritis and an active 30-pack-year smoker, presented with a 2-month history of shortness of breath, productive cough and pleuritic chest pains. She had accompanying low-grade fevers, night sweats, and a 20-lb weight loss. She had been on Prednisone, Methotrexate and Remicade infusions for 1 year with a negative PPD prior to treatment. On admission, she was afebrile, hemodynamically stable, and saturating 100% on room air. She had good air entry bilaterally, no wheezing, crackles or rhonchi. Chest xray (CXR) revealed thick-walled cavitary lesions in the right apex and right lower lobe (RLL). The right apical cavity had soft tissue within the central lucency. One of 2 bronchoalveolar lavage (BAL) specimens was positive for Galactomannan, however, bacterial, fungal and AFB cultures were negative. Follow up CXR showed development of an air-fluid level in the RLL cavity, and repeat sputum culture grew Achromobacter spp, so she was treated with Clindamycin. Two months later, CXR showed decrease in size and opacification of the RLL cavity, persistent right apical cavity, and she continued to be symptomatic. As such, she was evaluated by cardiothoracic surgery. She had wedge resection of these lesions, which showed fungal elements (septate hyphae) suspicious for Aspergillus, with histopathology showing necrotizing granulomas. The patient was started on Voriconazole.

Conclusion: We present a case and classic images of cavitary lesions in chronic necrotizing aspergillosis. Chronic necrotizing or semi-invasive aspergillosis occurs in individuals with chronic lung disease or mildly immunosuppressive conditions. As opposed to a simple aspergilloma, a preexisting cavity need not be present, but can be formed by the Aspergillus infection itself. Over time, cavities expand and paracavitary infiltrates occur, with a progressive loss of functional lung. BAL cultures are positive in only 50% of cases. Treatment is a prolonged course of anti-fungals, while a few aspergillomas may require resection. As internists, we are most familiar with the fungus ball and invasive pulmonary aspergillosis in severely immunocompromised patients, but should also recognize the other clinical entities and radiologic patterns of Pulmonary Aspergillus disease.

Presented at RGH Poster day May 21, 2015
MULTIPLE BILATERAL PULMONARY EMBOLISM FOLLOWING ANGIOPLASTY AND STENT PLACEMENT OF ARTERIOVENOUS GRAFT

Gokul Samudrala\textsuperscript{1}, David Levy\textsuperscript{1}, Deerajnath Lingutla\textsuperscript{2}, Michael DiSalle\textsuperscript{1}, and Wajid Choudhry\textsuperscript{3}

Although documented in the literature, the incidence of pulmonary embolism (PE) following arteriovenous graft (AVG) manipulation is rare. In fact there are only a few reports of clinically significant PE after manipulation of AVG. We will present a case of multiple clinically significant PE in one of our ESRD patients following angioplasty and stent placement of her AVG.

79 year old female with hypertension, congestive heart failure, chronic obstructive pulmonary disease and end stage renal disease on Hemodialysis 3 times per week was sent to the emergency department (ED) from dialysis center due to low blood pressure. One day prior to her presentation she had angioplasty of her AVG and a stent was placed. At presentation in the ED she was hypotensive and hypoxic. Chest X ray at presentation was suggestive of pulmonary vascular congestion. Computerized tomographic angiogram of the chest showed multiple bilateral pulmonary emboli. Doppler of bilateral lower extremities was negative for deep vein thrombosis and subsequent hypercoaguable workup was negative as well. She was started on a heparin drip which was changed to Coumadin prior to discharge home.

The above case illustrates that physicians should be aware of the potential for clinically significant thromboembolic disease following declotting/manipulation of AV grafts. We believe that future research is needed to determine if the rate of clinically significant PE following manipulation of AV graft is higher than currently believed. Perhaps new techniques will be developed in the future to help reduce the risk of thromboembolic disease following AVG manipulation.

\textit{Presented at National Kidney Foundation Spring Clinical meetings March 26th 2015}
A RARE CASE OF ACUTE MYOCARDIAL INFARCTION SECONDARY TO CORONARY EMBOLISM IN A PATIENT WITH NON-ISCHEMIC CARDIOMYOPATHY

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Introduction: Coronary embolism is a rare cause of acute myocardial infarction (MI). We are reporting a case of MI due to coronary embolism in a patient with Non-Ischemic Cardiomyopathy (NICM).

Case Description: Patient is a 75 year old female with a medical history of NICM with an ejection fraction (EF) of 10-15% first diagnosed in 2008. At that time an angiogram revealed normal coronaries and echocardiogram showed normal heart valves. Patient was admitted in 2014 for decompensation of her systolic congestive heart failure (CHF). While being treated for CHF, she suddenly developed new onset throat pain, followed by chest pain radiating to her left arm. Vitals at that time were notable for HR 92, BP 110/72, RR 18, Temp 98.4F and Spo2 100% on room air. EKG revealed left bundle branch block (LBBB) and was similar to her baseline EKG except for nonspecific T wave inversions in Lead I and V6 and mild ST segment elevations of the inferior leads. Troponin-I were 0.11,2,78 and peaked at 152. Emergent coronary angiogram revealed 100% occlusion of left obtuse marginal branch (OM1). Per cutaneous transluminal coronary angioplasty followed by embolectomy resulted in complete recanalization of the OM1. No atherosclerotic plaques were seen in any coronary arteries. Transthoracic Echocardiogram did not demonstrate any intra cardiac thrombus. Considering the fact that the patient had normal sinus rhythm, no valvular heart disease nor intracardiac thrombi, it was concluded that this embolus arose from the left ventricle given the severely depressed EF. Patient was anticoagulated with warfarin before discharge to home.

Discussion: It is a well-established fact that myocardial infarction can occur due to coronary embolism especially in patients with known history of mechanical valve replacement with inadequate anticoagulation, bio-prosthetic mitral valve, hypertrophic cardiomyopathy, atrial fibrillation with or without valvular heart disease and intramural thrombi. Coronary embolism in non-ischemic cardiomyopathy is extremely rare. An extensive search of literature revealed no case reports of MI secondary to coronary embolism in patients with NICM, normal valves, normal sinus rhythm and without intracardiac thrombi. Current guidelines recommend anticoagulation for at least 3 months in patients with LV dysfunction and intracardiac thrombi. However, there are no current guidelines on patients with embolic events and no intracardiac thrombi.

BRUGADA SYNDROME AND EPILEPSY- TWO SIDES OF THE SAME COIN?

Lalit Wadhwani MD

INTRODUCTION: Brugada syndrome (BS) is characterized by specific changes in the electrocardiogram (EKG) and may manifest as syncope, arrhythmia or sudden cardiac death. Epilepsy is a convulsive disorder which has multiple etiologies including genetic abnormalities. We are describing a case in which the patient has features of both these conditions which could represent a new clinical entity.

CASE DESCRIPTION: A 41 year old man with a history of epilepsy was brought to the emergency department (ED) after an episode of witnessed seizure and syncope. At the time of presentation, his vital signs were stable and he was alert but disoriented. There was no ongoing seizure activity and no focal neurological deficits were noted. The routine labs including complete blood count, serum electrolytes and troponin level were within normal range. EKG was suggestive of sinus rhythm with 1st degree atrioventricular block and type 1 Brugada pattern in leads V1 and V2. On review of records, we found that he had multiple visits to ED over the last 16 years for episodes of generalized tonic clonic and complex partial seizures. An interesting pattern was observed in his old EKGs, which showed Brugada pattern in leads V1 and V2 after each episode of seizure. Whereas the EKGs obtained on routine office visits showed no evidence of Brugada morphology. He was diagnosed with epilepsy at the age of 25 and underwent left temporal lobectomy a year later. The seizures continued despite the surgery and multiple anti-epileptic drugs. Multiple electroencephalograms were done after the surgery but no epileptiform discharges were ever noted. During this hospitalization, no significant events were noted on telemetry and a loop recorder was placed soon after discharge.

CASE DISCUSSION: Type 1 (coved type) BS is characterized by ST segment elevation with an upward convexity and an inverted T wave in leads V1-V3. BS and epilepsy are both associated with sodium channelopathies. The cause for BS is SCN5A gene mutation whereas SCN1A gene mutation is associated with epilepsy. The appearance of brugada pattern on EKG only at the time of seizure activity could be explained in several ways. Seizures in the absence of an epileptogenic focus in our patient may be due to cerebral hypoperfusion secondary to an arrhythmia in the setting of BS. However, an implantable loop recorder has documented normal sinus rhythm prior to and during his episodes of seizure. Hence a more interesting and likely possibility is the presence of a unique sodium channelopathy affecting the myocardium and neurons simultaneously.

CONCLUSION: An EKG must be obtained in patients with seizure to rule out arrhythmogenic convulsive syncope. Further genetic research may isolate a common sodium channelopathy for BS and epilepsy.

Presented at NYACP 2014
A Road Less Traveled- Epistaxis, Cocaine and Respiratory Depression
Wadhwani L, Singhal V, Tandon T, Alkhoury Z

**Background:** Cocaine acts as an anesthetic agent and has been approved by Food and Drug Administration (FDA) as a local anesthetic for nasal, laryngeal and oral mucosa.

**Case:** An 84 years old lady presented to the emergency department (ED) due to epistaxis. The epistaxis started spontaneously and was attributed to uncontrolled hypertension due to medication non-compliance. Nasal packing was done in the ED and during the procedure 0.4% topical cocaine solution was used for local anesthesia. This controlled the bleeding but soon after the procedure she became drowsy, hypoxic and hypotensive with an oxygen saturation of 78% on room air and blood pressure of 88/54 mm Hg. A Computed Tomography (CT) angiogram ruled out any aortic dissection and pulmonary embolism. CT scan of the head was normal as well. Electrocardiogram was not suggestive of any ischemic changes. Blood work including complete blood count and basic chemistries was normal. Troponin I was 0.01 and arterial blood gas was suggestive of respiratory alkalosis and hypoxemia. Supportive treatment was provided with intravenous fluids and oxygen mask. She regained alertness within one hour and soon her hypoxia and hypotension improved as well. She was monitored for 24 hours in the hospital but she did not have any repeat episodes of hypoxia or hypotension. The telemetry did not reveal any significant events either. The episode of hypoxia and hypotension was attributed to the use of topical cocaine and she was discharged home.

**Conclusion:** Cocaine is a serotonin-norepinephrine-dopamine reuptake inhibitor but due to its sodium channel blocking property it also acts as a local anesthetic, if used in low doses. Since it is a potent vasoconstrictor as well, it has been approved by FDA for local anesthesia in minor surgical procedures. Cocaine has multiple systemic effects but respiratory involvement occurs secondary to Central Nervous System (CNS) dysfunction. Contrary to prevalent thinking, cocaine inhibits sympathetic centers in the CNS. This leads to an increase in the rate and depth of breathing, which is followed by dyspnea and cyanosis. Progression of respiratory failure leads to hypoxia and unconsciousness. Due to its potential to cause respiratory depression, topical cocaine use should be avoided in the elderly.

*Presented at RGH Poster Day 2015*
Loophole in the Diagnosis of Vasovagal Syncope

Wadhwani L, Singhal V, Tandon T, Taylor S

**Background:** Syncope has multiple etiologies and diagnosing the underlying cause is often difficult. The most common cause of syncope in the United States is Vasovagal Syncope (VS) and sometimes patients, in whom the underlying etiology is unclear, are wrongly diagnosed with VS in the absence of evidence.

**Case:** A 29 years old lady presented to the emergency department after experiencing an episode of syncope. She has a history of multiple episodes of syncope since the age of 10 years. Her typical syncopal episodes were preceded by nausea and lightheadedness leading to transient loss of consciousness. An extensive workup in the past was unremarkable. Despite the negative tilt-table test she was diagnosed with VS since a few of the episodes occurred in emotionally stressful situations. On this presentation her vital signs were within normal limits and the electrocardiogram was suggestive of normal sinus rhythm. A basic metabolic panel including serum electrolytes was within normal limits. Echocardiogram was not suggestive of any structural heart disease. Since the diagnosis of VS was not well established, an implantable loop recorder was placed. She experienced another episode of syncope after 6 months and an interrogation of the loop recorder revealed a sinus pause of ten seconds, which correlated with the timing of syncope. The loop recorder was subsequently removed and a DDD pacemaker was placed.

**Conclusion:** Our patient was wrongly diagnosed for years despite negative tilt-table test, which is highly sensitive (80% sensitivity) for VS. Cardiac causes are associated with a substantial proportion of patients with syncope. Of the cardiac causes, arrhythmias are the most common, and are responsible for almost 14% of the syncope cases. In most of the cases, arrhythmias are not diagnosed with a single 12 lead electrocardiogram or even 24 hours of holter monitoring. Therefore, the role of implantable loop recorders is very crucial in the patients with no identified underlying cause of syncope, as it can record the heart rhythm for much longer durations of time. If high degree heart blocks or sinus pauses are identified as the cause of syncope, like in our patient, they can be treated with a pacemaker and future adverse events can be averted.

*Presented at RGH Poster Day 2015*
An Unheard Case of Recurrent Lyme Carditis

Lalit Wadhwani MD

INTRODUCTION: Lyme disease is a tickborne illness caused by Borrelia burgdorferi, which may affect multiple organ systems. Almost 1% of patients with Lyme disease develop Lyme carditis (LC) in the United States. Most of the cases of LC resolve after treatment with appropriate antibiotics. We are presenting a rare case of recurrent LC presenting with complete AV block, nine months after being treated for initial episode of LC.

CASE PRESENTATION: A 70 years old lady presented to the emergency department with the complaints of dizziness and lightheadedness for 2 weeks. Her vital signs were within normal limits except a heart rate of 48 beats per minute. An electrocardiogram was immediately obtained which revealed a first-degree heart block with a PR interval of 400 milliseconds. Review of telemetry revealed sinus pauses, which corresponded with her spells of dizziness. A temporary pacemaker wire was placed and she was admitted to the intensive care unit. Review of past history revealed that she was admitted 9 months earlier for similar complaints and was found to have complete heart block. At that time she had developed dizziness and vertigo 3 weeks after a boat cruise on the Hudson River. She had two target lesions on the back and her symptoms were attributed to LC. She was treated with Ceftriaxone for 4 weeks, which led to the resolution of symptoms and her PR interval progressively shortened and eventually normalized over months. During this admission she received empiric treatment with Ceftriaxone in view of known LC 9 months ago. Her symptoms resolved after a day of treatment initiation but she developed a target lesion at the same site as prior lesion. The AV block persisted but the PR interval improved with treatment. A permanent pacemaker was placed in view of persistent AV block and she was discharged to complete 4 weeks of Ceftriaxone therapy at home.

DISCUSSION: This case is unique in several ways. Our patient is a 70 years old lady and LC is usually seen in the age group of 10-45 years with men being much more susceptible than women. It usually resolves with appropriate antibiotic treatment within a few weeks and its recurrence is almost unheard of. But our patient presented with symptomatic heart block and developed characteristic target lesions on both occasions. As per the current literature, LC is caused by direct invasion of the cardiac tissue by the bacteria, leading to inflammatory changes, which further affect the conduction system. Recurrence of LC is usually not seen but could be secondary to initial evasion of immune response by the bacteria due to antigenic variation and expression of a new antigenic target under specific stimulus, leading to a delayed immune response. Further research is needed to completely understand the mechanism of recurrence.

Presented at SHM 2015
New Onset Multiple Sclerosis in a 27 Y/O Multigravida: A Rare Entity
Naidu Y, Soota K, Kanthala A, Barbara M, Lingutla D, Thornburg R

INTRODUCTION: Multiple sclerosis (MS) is a chronic autoimmune demyelinating disease of the CNS. It is more prevalent in females of reproductive age group. However, during pregnancy the severity and relapse rate decreases significantly and studies suggests that pregnancy has a protective effect on the risk to develop a first demyelinating event.

CASE: 27-year-old multigravida female at 25 weeks gestation, presented to the hospital with history of inability to walk due to progressive tingling and numbness from bilateral feet extending up to umbilicus over a period of 1-2 weeks. Physical Exam - Hypoesthesia from umbilicus to feet. Intact to temp. No focal neuro deficits. Labs: Unremarkable. Imaging: MRI without contrast of thoracic spine - hyper intensity demyelinating lesion at T7-T8. Diagnosed with transverse myelitis and discharged. Over next 4 weeks, she developed bilateral hand tingling, chest and trunk with slurring of speech and double vision. Shooting pain down the spine with flexion of the neck. Repeat MRI of head, cervical and thoracic spine showed multiple white matter lesions. Diagnosed with multiple sclerosis, treated with IV steroids. Underwent an elective C-section at 39½ wks of pregnancy, Currently, being treated with glatiramer acetate with pulsed iv steroids for severe Relapsing Remitting Progressive Sclerosis.

DISCUSSION: The effects of pregnancy on MS have been evaluated in different studies and all of them show that the risk of onset of MS is significantly reduced during pregnancy. An evolving model of pregnancy-associated immune changes suggests that the hormonal environment of pregnancy contributes to local suppression of cell-mediated immunity at the maternal-fetal interface while mediating a systemic change toward Th2 dominance. This suppresses cell mediated immune activity which is seen in auto-immune diseases (AID) leading to decreased severity of diseases like rheumatoid arthritis, uveitis, psoriasis, multiple sclerosis. Pregnancy in multiple sclerosis (PRIMS) study was to describe the evolution of MS in terms of relapses during pregnancy and it was observed that there was a decrease in the relapse rate during pregnancy, especially in third trimester, and a significant increase in the relapse rate in post-partum period.

CONCLUSION: We here present one of the rare cases of MS which first presented during pregnancy. There should be a longitudinal study to evaluate the prognosis of MS in patients who are first diagnosed during pregnancy, as we suppose that these patients will have a worse outcome compared to other patients.
REFERENCES


*Presented at Strong Memorial Hospital Annual Poster Competition.(October 2014)*
Myocardial Infarction versus Gall Bladder Infection: An Unusual Case of Cardio-Biliary Reflex
Naidu Y MD, Singh V MD, Alkhoury Z MD

Introduction:
Chest pain with ECG changes is usually indicative of acute coronary syndrome. However, non-cardiac clinical conditions may lead to ECG changes mimicking cardiac ischemia. We describe a case of 64 year old male with chest pain and dynamic ECG changes likely due to acute cholecystitis.

Case Presentation:

Pertinent Labs: normal CBC with WBC-9600 cells/µl, normal CMP with T. Bili-0.4 mg/dl, ALT, AST, AlkPO4 wnl, Troponin 0.05 →0.03 (normal high <=0.05ng/ml).

ECG new T-wave inversions in leads I, aVL, V2, V3 and V4 as compared to prior ECG.

Day 0: Patient admitted with concern of possible acute coronary syndrome, cardiology consulted and treatment initiated with sublingual nitroglycerine, aspirin, clopidogrel, low molecular weight heparin, metoprolol and statin. Echocardiography: normal systolic function, EF 60 %, no wall motion abnormality.

Day 1: Patient developed fever with leukocytosis of 17,000 cells/µl, and invasive cardiology workup was deferred due to possible infection. Further work-up included pan cultures (blood, urine and sputum).

Day 2: Blood cultures grew gram-negative rods and chest x-ray showed right basilar opacity. Patient was started on IV piperacillin-tazobactam 3.375 mg/ 6h and IV azithromycin 500 mg/ 24h for possible pneumonia.

Day 3: Total bilirubin increased to 2.7 mg/dL and ALT, AST, AlkPO4 were wnl. Ultrasound abdomen showed no gall bladder pathology.

Day 4: Chest pain continued along with fever, leukocytosis and hyperbilirubinemia. Eventually, HIDA scan suggested cystic duct obstruction and acute cholecystitis. Antibiotic coverage was changed to IV piperacillin-tazobactam 3.375 mg/ 6h and IV metronidazole 500 mg/ 8h. Patient underwent emergent percutaneous cholecystotomy.
Post-surgery, chest pain and clinical condition improved. ECG after 2 weeks revealed resolution of ECG changes to baseline (Fig 3) and nuclear stress test was negative for ischemia.

**Discussion:**

Vagally mediated cardio-biliary reflex causing coronary vasospasm is the presumed mechanism that led to ECG changes in our patient. There have been few case reports of acute cholecystitis presenting with ECG changes. Physicians should be familiar with these associations to ensure appropriate diagnostic investigations and to avoid premature closure. This case report is unique in that our patient had no cardiac history, presented with ECG changes mimicking acute coronary syndrome that resolved with treatment for cholecystitis and had a subsequent negative cardiac workup for ischemia.

**References:**


*Presented at Thirteenth annual city wide poster competition (05/21/2015)*

*Honorable mention/ Won 2nd prize in Clinical Vignette presentation*
Doege-Potter syndrome and papillary thyroid cancer: coincidence or cause and effect?

Chinenye Osuorji, MD, Amer Issa MD, Mathew Ferrantino MD, Denisa Slova MD, K.K Rajamani MD

Abstract:

Background: Doege-Potter syndrome is a rare paraneoplastic syndrome characterized by hypoglycemia caused by a non-islet cell tumor, usually a solitary fibrous tumor of the pleura (SFTP) or a retroperitoneal tumor. These tumors cause hypoglycemia through secretion of a prohormone form of insulin-like growth factor-2 (IGF-2).

Case presentation: A 74-year-old male of Asian descent presented for evaluation of a multinodular goiter. A chest X ray disclosed a lung nodule. Biopsy of a thyroid nodule was reported as an atypical follicular lesion. The patient declined any further evaluation of the thyroid or lung nodules. A year later he returned with recurrent hypoglycemia associated with mental status changes that resolved after administration of intravenous dextrose. Laboratory tests at the time of presentation were as follows: blood glucose 42 mg/dl, serum insulin < 1 uIU/ml (3-25 uIU/ml), C-peptide < 0.1 ng/ml (0.8-3.9 ng/ml), insulin-like growth factor-1 (IGF-1) 66 ng/ml (34-245 ng/ml), IGF-2 1348 ng/ml (411-1248 ng/ml), and IGF binding protein-2 (IGF BP-2) 382 ng/ml (47-350 ng/ml). A chest CT revealed a large right pleural-based mass. Surgical resection disclosed an 18x15x4 cm mass which was well circumscribed and grossly encapsulated. KI-67 staining showed no increase in mitotic activity. The mass was reported to be morphologically consistent with a benign solitary fibrous tumor. The patient's hypoglycemic symptoms completely resolved with resection of the tumor. The patient subsequently underwent a total thyroidectomy, which disclosed multifocal papillary thyroid carcinoma.

Discussion: SFTP is a non-islet cell mesenchymal tumor of the pleura which is usually benign. It can present with hypoglycemia as a paraneoplastic syndrome caused by hypersecretion of “big IGF-2”, a partially processed precursor of IGF-2. Big IGF-2 activates insulin receptors, increases peripheral glucose uptake, especially by skeletal muscle, and inhibits hepatic glycogenolysis and gluconeogenesis, thereby resulting in hypoglycemia. Hypoglycemic symptoms and elevated levels of serum big IGF-2, in combination with increased levels of IGF BP-2, are highly suggestive of the diagnosis. A definitive diagnosis is made by pathology and by resolution of hypoglycemia after complete resection of the tumor, as was demonstrated in this case. We postulate that elevated IGF-2 levels produced by this type of tumor may be a factor in the growth of secondary tumors, in this case a papillary thyroid cancer, possibly by activating IGF-2 receptors.

- Presented at AACE (American Association of Clinical Endocrinologists) annual meeting Nashville, Tennessee 2015