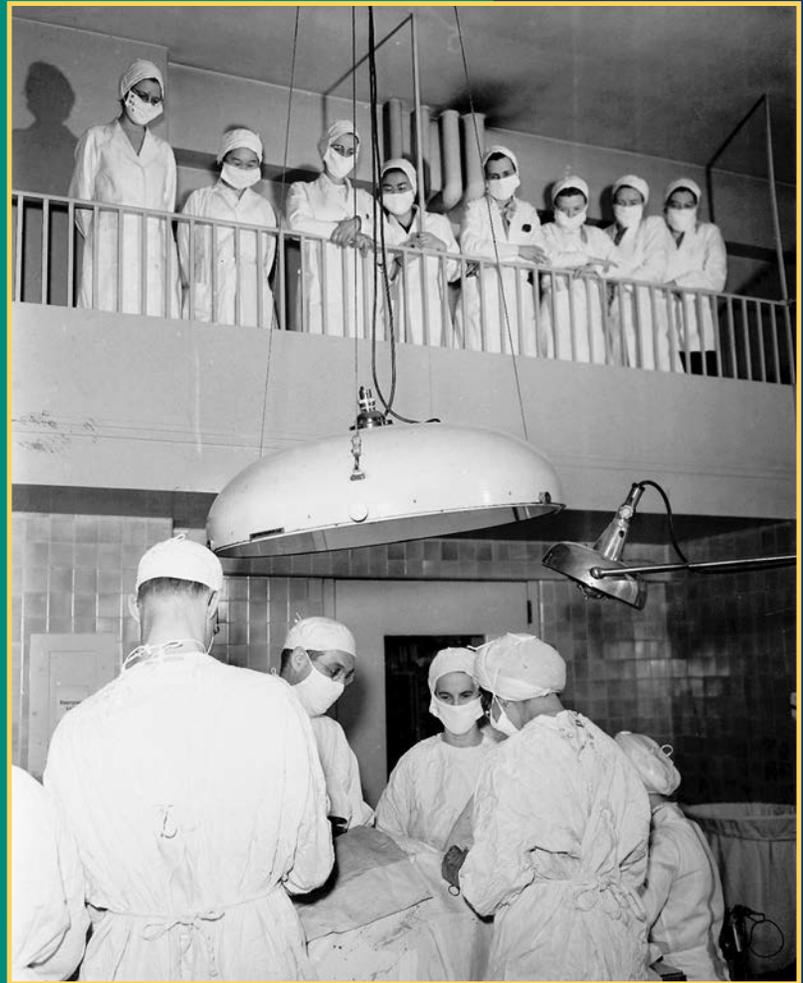


# DREXEL MED JOURNAL

**SPRING  
2015**

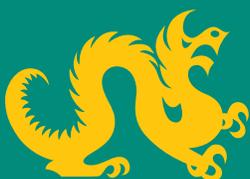
Volume 9, Number 1

**A Graduate  
Medical  
Education  
Publication**



**By House Staff at:**

Abington Memorial Hospital  
Allegheny General Hospital  
Easton Hospital  
Hahnemann University Hospital  
Mercy Catholic Medical Center  
Monmouth Medical Center  
St. Christopher's Hospital for Children  
Virtua Health  
York Hospital



**DREXEL UNIVERSITY**  
College of  
**Medicine**

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**On the Cover:** photograph, Students at Woman's Medical College observing a surgical procedure in 1947. Image supplied courtesy of the Drexel University College of Medicine Legacy Center Archives. For information, visit [archives.drexelmed.edu](http://archives.drexelmed.edu)

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## DEAN'S RECOGNITION

Over 10 years ago, Dr. Jay Yanoff in his role as Designated Institutional Official for Hahnemann University Hospital dreamed of an annual publication to memorialize the scholarly activity of our GME trainees. Dr. Mark B. Woodland took this to the next level and conceptualized an internal journal that could be used for this purpose as well as expanded to be utilized in a similar fashion to memorialize other scholarly activities of the medical school. They served as the founding Editors of what is now called the *DrexelMed Journal*.

As this is the 9th Edition of the successful culmination of that dream, it is with mixed emotions that we wish farewell to Dr. Woodland as he moves on to become the Chair of OBGYN for the Reading Health System. While he is keeping his academic title with the college of medicine, he will be stepping down from his formal positions. In honor of his contributions to the *DrexelMed Journal* over the last 10 years, it is my pleasure to give him the title of Emeritus Editor. Please join me in congratulating Dr. Woodland and thanking him for his leadership of the *DrexelMed Journal*.

### Daniel V. Schidlow, MD

Annenberg Dean and Senior Vice President, Medical Affairs  
Drexel University College of Medicine

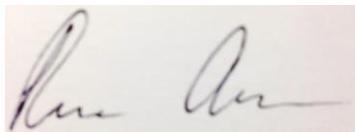
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## EDITORIAL COMMENTS

We are happy to present the 9<sup>th</sup> issue of the *DrexelMed Journal*, featuring scholarly works of the graduate medical education trainees of Drexel University College of Medicine, Hahnemann University Hospital and their affiliate training programs.

Additionally, we welcome the new leadership of Dr. Renee Amori who assumed the role of Editor In Chief earlier this year. Dr. Amori took over the helm of the *DrexelMed Journal* replacing Dr. David Berkson. Dr. Berkson was with the journal for many years and under his guidance we were able to streamline a dedicated, secure on-line submission process and facilitate an improved editorial process. Dr. Amori has aspirations of taking the journal further through the process of developing an in-house peer review process and enhancing the web access and submission process.

We offer a special thank you to Dr. Berkson and welcome to Dr. Amori as we present the 9<sup>th</sup> issue of the *DrexelMed Journal*.



**Renee Amori, MD**  
Editor-in-Chief  
Assistant Professor, Associate  
Program Director, Endocrinology



**Mark B. Woodland, MS, MD**  
Program Director, OB-GYN  
Vice Dean, GME  
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**Jay M. Yanoff, EdD**  
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# ABSTRACTS

## 1. 30-Day Heart Failure Readmission Risk Factors: An Analysis of 991 admissions.

Abhinav Agrawal, MD\*, Sarfaraz Jasdanwala, MD\*, Hadie Razjouyan, MD\*, Rivi DeSilva, MD\*, John Checton, MD\*\*

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**Introduction:** Heart Failure (HF) affected approximately 5.1 million Americans in 2013. Readmission is an important concern in patients with HF. Approximately 25% of patients will be readmitted 30 days post hospital discharge. Our aim was to investigate the readmission rate and risk factors for HF in a community hospital setting. **Methods:** In a retrospective cohort study 991 adult hospital admissions with a principal diagnosis of HF were studied over four years. Baseline and demographic information of these patients was analyzed. In addition, prevalence of specific co-morbidities was studied in these patients. Patients with concomitant diagnosis of STEMI or NSTEMI, undergoing cardiac catheterization, stent placement, IABP placement, pacemaker, ICD were excluded. Multivariate regression analysis was performed to evaluate risk factors contributing to 30-day heart failure readmission (HFR).

**Results:** The overall 30-day HFR rate was 4.8%. Characteristics of patients who were readmitted within 30 days are shown in table 1. Co-morbidities, which had significantly higher prevalence in the HFR group, include complicated hypertension, iron deficiency anemia and neurological disorders. On multivariate regression analysis, co-morbidities with strongest association to 30 day HFR were complicated hypertension, hypothyroidism and iron deficiency anemia.

Ref.

1. Desai AS, Stevenson LW. Rehospitalisations for heart failure: Predict or prevent?. *Circulation*. 202;126:501-6
2. Al-khazaali A, Arora R, Helu HK. Effective strategies in reducing rehospitalisations in patients with heart failure. *Am J Ther*. 2014. Jun 9. {Epub ahead of print}

Table :

Baseline Characteristics	30 days readmissions (n=33)		
	Yes	No	P value
Age, mean (SD)	76.7 (11.3)	76.2 (14.0)	0.79
Gender, Male (%)	17 (51.5)	317 (48.7)	0.75
Length of Hospital stay on index admission, mean (SD)	5.6 (4.1)	5.5 (3.9)	0.86
Co-morbidities	30 days readmissions (n=33)		
	Yes	No	P value
Alcohol abuse, No (%)	2 (5.7)	31 (4.8)	0.80
Drug abuse	1 (3.0)	12 (1.8)	0.62
Blood Loss anemia	0	33 (5.0)	0.29
Coagulation deficiency	3 (5.7)	30 (4.8)	0.76
Deficiency anemia	21 (6.8)	12 (3.2)	0.03
Dm w/o complications	6 (7.7)	27 (4.5)	0.20
Dm w complications	8 (4.0)	25 (5.2)	0.50
Hypertension, complicated	14 (42.4)	169 (26.0)	0.03
Hypertension, uncomplicated	10 (30.3)	216 (33.2)	0.73
Hypothyroidism	3 (9.1)	148 (22.7)	0.06
Obesity	6 (18.2)	121 (18.6)	0.95
Other neurologic disorders	0	69 (10.6)	0.04
Pulmonary Circ Disorder	6 (18.2)	165 (25.3)	0.35
PVD	10 (30.3)	125 (92.6)	0.11
Renal Failure	16 (48.5)	249 (38.20)	0.23
Valvular disease	18 (54.5)	321(49.3)	0.55
MULTIVARIATE ANALYSIS			
Co-morbidities	Odds Ratio (95% CI)	P value	
Deficiency anemia	1.98 (0.94-4.15)	0.06	
Complicated HTN	1.92(0.93- 3.97)	0.07	
Hypothyroidism	0.32 (0.09-1.09)	0.06	

**Conclusion:** Co-morbidities with strongest association to 30 days HFR include complicated hypertension, hypothyroidism and iron deficiency anemia. On preliminary analysis demographic variables did not play significant role in 30-day HFR.

## 2. Clinical Predictors of Higher GRACE Risk Score: Subgroup analysis in STEMI patients

Eduard Koman, MD\*, Obiora Anusionwu, MD\*\*, Parshva Patel, MD\*\*\*, Peter Kurnik, MD\*\*\*\*, Gary Ledley, MD\*\*\*\*

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\*\*Drexel University College of Medicine: Cardiovascular Disease

**INTRODUCTION:** Patients with ST elevation myocardial infarction (STEMI) often present with numerous comorbidities. Global Registry of Acute Coronary Events (GRACE) risk score is one of the most widely used risk stratification tools in acute coronary syndrome. Our objective was to evaluate additional clinical risk factors which predict high GRACE risk score in STEMI patients(1).

**METHODS:** We retrospectively reviewed 129 consecutive patients admitted with STEMI who underwent a cardiac catheterization from December 2009 - June 2013. Spearman correlation was used to measure correlation between risk factors and GRACE risk score.

**RESULTS:** Age 60 (IQR 50-69), Male 72%, GRACE risk score 144 (IQR 111-171), LOS 4 (IQR 3-6) were analyzed for all patients who survived (n=119). Demographics included diabetes 38 (31.9%), hypertension 78 (65.5%), hyperlipidemia 60 (50.4%), smoking 66 (55.5%), prior TIA/stroke 17 (14.3%), peripheral artery disease (PAD) 7 (5.9%) and chronic kidney disease (CKD) 5 (4.2%). Higher GRACE risk score was associated with diabetes (164±49 vs 143±48), CKD (188±81 vs 148±47), hyperlipidemia (154±48 vs 147±50) and PAD (177±31 vs 148±50). GRACE risk score had

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significant correlation with diabetes and PAD (Spearman rho, p-value) [0.2, p=0.01; 0.2, p=0.02 respectively]. In multivariate analysis ejection fraction (EF) independently predicted GRACE risk score [-1.02, 95% CI -1.56 - -0.47, p<0.001].

**CONCLUSION:** Our research demonstrated various predictors of higher GRACE risk score which in turn help to risk stratify STEMI patients. These include diabetes, PAD and EF. These risk factors are objective finding that may aid clinician to guide and predict risk in STEMI patients

Ref.

1. Granger CB. Strategies of patient care in acute coronary syndromes: rationale for the Global Registry of Acute Coronary Events (GRACE) registry. Am J Cardiol 2000; 86:4M-9M.
2. Wilson BH et al. Achieving sustainable first door-to-balloon times of 90 minutes for regional transfer STEMI. JACC Cardiovasc Interv. 2013;6(10):1064-71
3. Fukii T., Suzuki T., Torii S., et al. Diagnostic accuracy of Global Registry of Acute Coronary Events (GRACE) Risk Score in ST-elevation myocardial infarction for in-hospital and 360-day mortality in Japanese patients. Circulation Journal. 2014; 78(12):2950-2954.

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## 3. Risk Factors in Patients with Heart Failure

Jamael Hoosain, MD\*, Sabrina Islam, MD\*\*, Longlian Liu, MD\*\*\*, Howard Eisen, MD\*\*

\*Drexel University College of Medicine: Internal Medicine

\*\*Drexel University College of Medicine: Department of Medicine, Division of Cardiology

\*\*\*Department of Epidemiology and Biostatistics, Drexel University School of Public Health: Department of Medicine

**Introduction:** About 5.4 million Americans suffer from congestive heart failure, which in longitudinal studies, has high morbidity and mortality. Risk factors continue to be studied and identified to prevent heart failure occurrence, and progression.

**Methods:** In this retrospective, cross-sectional and longitudinal chart review of individuals with heart failure with reduced ejection fraction (HFrEF) we

investigated the following factors: age, race, gender, BMI, Type 2 diabetes mellitus, Chronic Kidney Disease, insurance, and zip code in order to identify whether healthcare disparities are present. The study population is a cohort from 2005-2013 at the Advanced Center for Heart Failure Care Clinic at Hahnemann University Hospital in Philadelphia, Pennsylvania of 49 individuals, 18 female, 31 male, 24 African-

American, 23 Caucasian and 2 Hispanic. New York Heart Association (NYHA) functional class, changes in anthropomorphic parameters including, BMI, systolic and diastolic blood pressure were recorded. Echocardiographic parameters including left ventricular ejection fraction, LV end diastolic diameter and LV mass were assessed.

Results: The mean creatinine among living subjects was 1.16 and 2.34 among deceased patients ( $p=0.01$ ). The mean EF among living subjects was 32% and 23% among the deceased ( $p=0.08$ ). The mean SBP in living subjects was 121mmHg and 114mmHg among the deceased ( $p=0.22$ ), and the mean DBP in living subjects was 68mmHg and 62mmHg among the deceased ( $p=0.27$ ).

Discussion: Our results indicate significant differences in the characteristics between the living and deceased patients including a significantly

worse renal function among deceased patients. Further studies with a larger sample size may further delineate these relationships.

Ref.

1. Brouwers, F., de Boer, R. Van der Harst, P. et. al.. "Incidence and epidemiology of new onset heart failure with preserved vs. reduced ejection fraction in a community-based cohort: 11-year follow-up of PREVEND." European Heart Journal. e-published March 6th, 2013.
2. van Jaarsveld, H. , Ranchor, A., Kempen, G., et. al. "Epidemiology of heart failure in a community-based study of subjects aged  $> \text{ or } = 57$  years: Incidence and long-term survival." European Journal of Heart Failure. 8 (2006) 23 – 30.
3. Hossain, W. , Ehtesham, M. , Salzman, G., et.al. "Healthcare Access and Disparities in Chronic Medical Conditions in Urban Populations." Southern Medical Association. (2012)

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#### 4. Raynaud's Phenomenon Could Be More Serious

Case: A 27 year old male with past medical history of asthma and smoking presented with complaints of Case: A 27 year old male with past medical history of asthma and smoking presented with complaints of intermittent painful bluish discoloration of his fingers associated with numbness and tingling. There was no conjunctival pallor, lymphadenopathy or hepatosplenomegaly. Initially it was thought to be primary Raynaud's phenomenon (RP) and he was advised to quit smoking and avoid cold exposure. The measures did not help and the symptoms persisted. On the follow up visit his bloodwork revealed abnormal leucocytosis with WBC 30.2, segments 68%, lymphocytes 21%, metamyelocytes 3%, myelocyte 1%, platelet 236, Hemoglobin 13.8, LDH 353. The vasculitis work up for secondary RP was negative with normal RF and negative ANA and c ANCA.

The CT angiography of upper extremity did not show any vascular occlusion. Later the patient had cytogenetic testing with fluorescence in situ

hybridization (FISH) that revealed BCR/ABL1 fusion gene in 90% of the nuclei resulting from

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classic t(9:22), consistent with chronic myeloid leukemia (CML). He was treated with tyrosine kinase inhibitor imatinib, helping in resolution of his symptoms.

Discussion: CML accounts for approximately 15 to 20% of leukemias in adults and has an annual incidence of 1 to 2 cases per 100,000, with a slight male predominance (1). 20 to 50% of patients are asymptomatic and are diagnosed on routine bloodwork (2). Symptoms in order of decreasing incidence include fatigue, bleeding, weight loss, excessive sweating, abdominal fullness and malaise. This case illustrates the potential of RP to precede the diagnosis of CML (3).

Ref.

1. Chen Y, Wang H, Kantarjian H, Cortes J. Trends in chronic myeloid leukemia incidence and survival in the United States from 1975 to 2009. *Leuk Lymphoma* 2013; 54:1411
2. Faderl S, Talpaz M, Estrov Z, et al. The biology of chronic myeloid leukemia. *N Engl J Med* 1999; 341:164
3. Savage DG, Szydlo RM, Goldman JM. Clinical features at diagnosis in 430 patients with chronic myeloid leukaemia seen at a referral centre over a 16-year period. *Br J Haematol* 1997; 96:111

## 5. A Rare but Lethal Hepatic Complication of Sickle Cell Disease: Sickle Cell Intrahepatic Cholestasis

Aamir Malik\*, MD, Chandni Merchant, MD\*, Mana Rao, MD\*, Rikka Banayat, MD\*, Rosemary Fiore, MD, PhD\*\*

\*Monmouth Medical Center: Internal Medicine

\*\*Monmouth Medical Center: Department of Medicine, Division of Hematology/Oncology

**INTRODUCTION:** Sickle cell disease can affect the liver by way of the disease process as well as its treatment. The sickling of RBCs in the hepatic sinusoids can cause complications like acute sickle hepatic crisis, hepatic sequestration crisis, benign hyperbilirubinemia and the most severe variant, sickle cell intrahepatic cholestasis (SCIC) (1).

**CASE:** We present a case of 31 year old male with past medical history of sickle cell disease and remote cholecystectomy who was admitted with fever, upper abdominal pain and jaundice for 2 days. During the hospital stay there was an accelerated rise in total bilirubin of 50, direct bilirubin 38, Cr 3.0. His Hemoglobin was 6.4, reticulocyte count 3.0, ALT 40, AST 155. Hepatitis panel was negative and ERCP showed normal caliber of the common bile duct with no obstruction. Exchange transfusion of 9 units of packed red blood cells led to drastic improvement of the clinical status as well as the laboratory parameters.

**DISCUSSION:** SCIC unlike other hepatic complications requires vigorous exchange

transfusion. 17 cases have been reported so far out of which 8 survived due to exchange transfusion and correction of coagulopathy with FFP within 48 hours (2). Renal impairment in SCIC has not been well studied but usually is reversible with the hepatic impairment like in this case. Unresolved renal impairment will require dialysis and is associated with poor outcome (3). A timely diagnosis of SCIC and appropriate management is lifesaving.

**Ref.**

1. Ebert EC, Nagar M, Hagspiel KD. Gastrointestinal and hepatic complications of sickle cell disease. Clin Gastroenterol Hepatol 2010; 8:483
2. Shao SH, Orringer EP. Sickle cell intrahepatic cholestasis: approach to a difficult problem. Am J Gastroenterol 1995; 90:2048
3. Khan MA, Kerner JA. Reversal of hepatic and renal failure from sickle cell intrahepatic cholestasis. Dig Dis Sci 2011; 56:1634

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## 6. Hypernatremia: A Surrogate Marker For Sepsis?

Myriam Vela-Ortiz, MD\*, Nay-Thi Tun, MD\*\*, Jacek Jodelka, MD\*\*

David Livert\*, Richard Snyder, DO\*\*, Mahesh Krishnamurthy, MD\*\*

\*Easton Hospital: Medicine

\*\*Easton Hospital: Department of Medicine

**Introduction:** Hypernatremia is an extremely common condition in elderly patients upon hospital admission. The mortality rate of patients with hypernatremia is significantly higher than that of "eunatremic" patients.

**Methods:** We evaluated retrospectively the records from 2008 to 2010 of patients with high sodium levels on admission, greater than 145 mmol/L. Patients who received a diagnosis of sepsis or SIRS as documented either on the admission note or discharge summary were included in the cohort. **Results:** We reviewed the medical records of 150 patients older than 60 years old who on admission had hypernatremia. 77.4% also were diagnosed with infection, SIRS or sepsis on admission and 87.7% at the time of discharge. The most common

infection type associated with hypernatremia was Urinary Tract Infection (UTI) (46.3%) followed by pneumonia (41.3%). Hypertension was the most prevalent comorbidity (50%), 50 % of the patients had a sodium on admission in between 145 and 155 mmol/L and 10 % had a sodium level higher than 165mmol/L. Hypokalemia was concomitantly present in 22% of the patients, hyperglycemia in 40 % of the patients and elevated creatinine in 54% of the patients.

**Conclusions:** Our study shows a positive correlation between hypernatremia found on admission and the presence of infection especially in the elderly population and in patients who carried a diagnosis of dementia in whom the thirst center may be altered. We suggest that the existence of hypernatremia should spur the clinician to further investigate for a possible source of infection especially in elderly patients.

Ref.

- 1: Vanderghyest F, Sakr Y, Felleiter P, Hering R, Groeneveld J, Vanhems P, Taccone FS, Vincent JL. Incidence and prognosis of dysnatraemia in critically ill patients: analysis of a large prevalence study. *Eur J Clin Invest.* 2013 Sep;43(9):933-48.
  - 2: O'Donoghue SD, Dulhunty JM, Bandeshe HK, Senthuran S, Gowardman JR. Acquired hypernatraemia is an independent predictor of mortality in critically ill patients. *Anaesthesia.* 2009 May;64(5):514-20
- 

## 7. Anticoagulation in Atrial Fibrillation: A case of Warfarin Induced Skin Necrosis (WISN)

Chukwunweike Nwosu, MD\*, Ritesh Rampure, MD\*\*, Dipesh Uprety, MD\*

\*Abington Memorial Hospital: Internal Medicine

\*\*Abington Memorial Hospital: Department of Medicine, Division of Internal Medicine

**Case:** A 72 year old female with history of kidney transplant and atrial fibrillation on Warfarin, presented with worsening medial right leg ulcer and pain of 3 weeks. The ulcer started as a macule, became edematous, then necrotic. Examination revealed erythematous blue-black necrotic ulcer with serous discharge (Figure 1). Lab tests were normal. Imaging studies revealed vascular calcifications with bilateral popliteal artery stenosis. Treatment was started for cellulitis with further work up for peripheral vascular disease, calciphylaxis and eventually WISN. Further history revealed interruption of Warfarin therapy prior to onset of the ulcer. A biopsy of the ulcer was suggestive of WISN.

**Discussion:** Warfarin inhibits vitamin K-dependent coagulation factors which includes naturally occurring inhibitors of coagulation. It can initially be potentially thrombogenic causing WISN typically in the first several days of therapy (1). WISN occurs in about 0.01-0.1% of patients (2). Delay in diagnosis and treatment of this rare dermatologic complication can be potentially devastating (3). Challenges to Warfarin therapy, in addition to complications and interactions, include dosing and monitoring complexities with patients therapeutic only about 60% of the time. The new drugs (Dabigatran, rivaroxaban, and apixaban) are equally effective with simpler regimens, but are more expensive, have no easy means of monitoring, and are less studied with minimal post

market data (4). They have no reversal agents although some potential antidotes (Andexanet and a Fab fragment) are being studied (5).



Figure 1

Patient demographics, preferences, health literacy, bleeding concerns, and physicians' preferences, are factors that may contribute to choice.

Ref.

1. Bauer KA. Coumarin-induced skin necrosis. *Arch Dermatol* 1993;129:766
2. Eby CS. Warfarin-induced skin necrosis. *Hematol Oncol Clin North Am* 1993;7:1291-1300
3. Chan YC, Valenti D, Mansfield AO, Stansby G. Warfarin induced skin necrosis. *Br J Surg* 2000;87:266-272
4. Steinberg BA, Piccini JP. Anticoagulation in atrial fibrillation. *BMJ* 2014;348:g2116 (5) Hughes S. Promising data on antidote to new anticoagulants. *Medscape.* Dec 20,2013

## 8. SELECTION OF THE OPTIMAL COMBINED GENERAL-REGIONAL ANESTHETIC TECHNIQUE IN A COMPLEX PATIENT UNDERGOING VASCULAR SURGERY

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**OBJECTIVE:** Patients presenting for vascular surgery oftentimes have comorbidities making anesthetic management challenging. This case report offers insight into medical decision-making necessary to create an appropriate anesthetic plan for complex patients with numerous medical concerns and anatomical limitations undergoing an above the knee amputation[AKA].

**CASE-REPORT:** A 66-year-old female with ESRD on hemodialysis, diabetes, atrial fibrillation, COPD required a right-sided AKA. Malfunctioning hemodialysis catheters required multiple replacements exhausting all potential upper extremity access resulting in a right groin AV graft. Ischemia secondary to steal phenomenon from the graft prompted a below the knee amputation[BKA] which healed improperly leading to the planned AKA. Given limited hemodialysis access options, the surgeons declined catheter replacement. Considering anatomical barriers and hemodialysis

graft preservation needs, a combined general-regional anesthetic plan was developed. Sciatic block with catheter placement for continuous usage intra- and post-operatively addressed posterior analgesia of the thigh while a lumbar plexus block covered anteriomedial and lateral aspects. Femoral blockade posed greater infection risks and potential graft destruction, hence was not pursued. Regional blockade with catheter placements were performed without complications under ultrasound-guidance [figures1/2]. General anesthesia, in conjunction with the continuous catheter infusions at the lumbar plexus and sciatic nerve, allowed minimal intra-and post-operative opiate requirements.

**DISCUSSION:** This combined general-regional anesthetic technique allowed this complex patient to receive adequate analgesia during and after her procedure with minimal opiate requirements and volatile anesthetic exposure. Our regional anesthesia selection of lumbar plexus versus femoral blockade minimized infection by avoiding proximity to the hemodialysis sheath and preserved graft vascularity.



Figure 1 (left)Right Sided Sciatic Nerve Block



Figure 2 (right)Right Sided Lumbar Plexus Block

### Ref.

1. Anton JM, McHenry ML. Perioperative management of lower extremity revascularization. *Anesthesiology Clin.* 2014;32:661-676.
2. Barbosa FT, Juca MJ, Castro AA, et al. Neuraxial anesthesia for lower limb revascularization. *Cochrane Database Syst Rev.*

2013;7:CD007083.

3. Flaherty J, Horn JL, Derby R. Regional anesthesia for vascular surgery. *Anesthesiology Clin.* 2014;32:639-59.
4. Ghanami RJ, Hurie J, Andrews JS, et al. Anesthesia-based evaluation of outcomes of lower-extremity vascular bypass procedures. *Ann*

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## 9. Bivalirudin Used in Patient with history of Heparin- Induced Thrombocytopenia (HIT) with Previous Coronary Artery Bypass Graft (CABG)

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**Introduction:** Heparin-Induced Thrombocytopenia (HIT) is an undesirable effect of heparin that could lead to systematic and fatal thrombosis.<sup>2</sup> Patients with previous diagnosis of HIT require alternative for anticoagulation.

**Case Presentation:** A 71 year old female presents for a left carotid endarterectomy (CEA). The patient developed HIT after a CABG fifteen years ago, presenting with thrombotic events and requiring a month in the ICU. Bivalirudin was used for the patient's awake CEA. Five months later the patient had a bilateral femoral artery endarterectomy and femoral-femoral bypass with bivalirudin, also with no complications.

**Discussion:** HIT is associated with a risk of thromboembolic events, clinically significant bleeding, and life-threatening complications (1-3). HIT is transient with recovery of normal platelet count within days to weeks and disappearance of pathologic HIT antibodies within weeks to months<sup>(2)</sup> direct thrombin inhibitors are recommended for first line therapy (3), with argatroban being the only FDA approved drug for treatment and prevention of HIT<sup>(1,2)</sup>. Argatroban has a significantly longer half-life compared to bivalirudin (50 vs 25 minutes)<sup>(1)</sup>, making bivalirudin more desirable for surgical

procedures. A retrospective analysis in patients with known or suspected HIT showed a greater proportion of patients with supratherapeutic PTT with argatroban versus bivalirudin (18% vs 8%), similar bleeding events and time to therapeutic goal, and thromboembolic events developing in 8% of patients with bivalirudin versus 4% with argatroban (3).

**Conclusion:** Bivalirudin, due to its fast onset, short half-life and minimal renal excretion (2) appears to be a safe alternative for prevention and treatment of HIT for surgical patients (1-3)

**Ref.**

1. Joseph, L. et al. Bivalirudin for the Treatment of Patients with Confirmed or Suspected Heparin-Induced thrombocytopenia. J Thromb Haemost. 2014 Jul;12(7):1044-53
2. Warkentin, T. et al. Heparin-Induced Thrombocytopenia: Recognition, Treatment, and Prevention. Chest. 2004 Sep;126(3 Suppl):311S-337S
3. Skrupky, L. et al. Comparison of Bivalirudin and Argatroban for the Management of Heparin-Induced Thrombocytopenia. Pharmacotherapy. 2010 Dec;30(12):1229-38

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## 10. Aortic dissection presenting as anterior spinal cord syndrome

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\*\* Allegheny General Hospital: Department of Neurology.

**Introduction:** Spinal cord infarction, even though rare should be considered high in the differential diagnosis in a patient with spinal cord localization of signs and history of aortic repair.

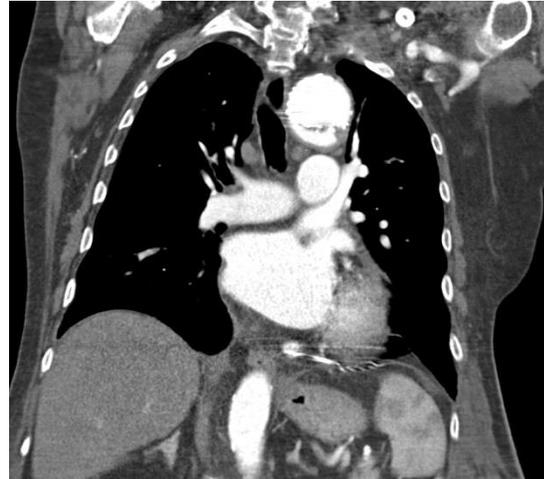
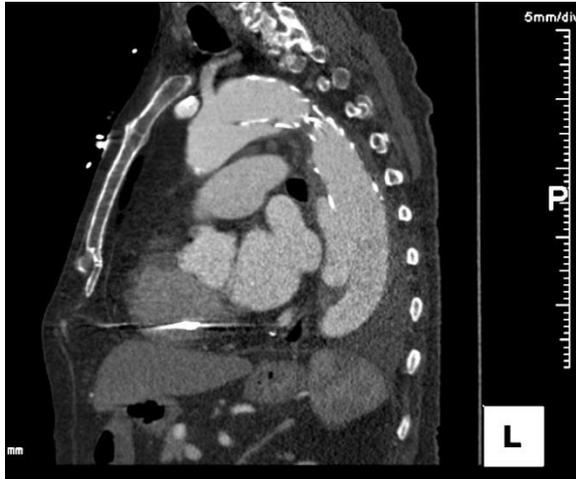
**Case:** 81-year-old male with history of hypertension, type 2 diabetes mellitus, congestive heart failure status post automated implantable cardioverter-defibrillator, atrial fibrillation on

coumadin, distal thoracic aortic arch penetrating ulcer s/p endovascular graft presented with altered mental status and upper abdominal pain for 1 day. Blood pressure was 120/94 and he was afebrile. He became paraplegic in the emergency room and the sensory level was at T10 with loss of pain and temperature sensations. Vibration sensation was intact throughout. Deep tendon reflexes were absent in bilateral lower extremities and plantar reflexes were mute. Pulsations were feeble in dorsalis pedis artery with intact popliteal artery pulse. Anal sphincter tone was decreased. Cranial nerve examination and neurological examination of upper extremities were intact. Prothrombin time was 5.4. CT thoracic and lumbar spine did not show hemorrhage, fractures or compression. MRI

was contraindicated in this patient and the family refused to give the consent for CT myelogram.

CTA chest, abdomen and pelvis showed type Ia endoleak of the proximal thoracic aortic endograft,

with 10 to 11 mm retraction of the proximal endograft; type Ib endoleak of the distal thoracic aortic endograft with likely retrograde filling; type B aortic dissection of mid-thoracic aorta; and thrombus in the inferior margin of the dissection.



Discussion: Anterior spinal cord syndrome is a rare presentation of aortic dissection. Differential diagnoses to be considered for acute anterior spinal cord syndrome are spinal cord hematoma, spinal cord compression and spinal cord infarction. The level of spinal cord involvement can be appropriately localized by thorough physical examination.

Ref.

1. Painless transient paraparesis as the solitary manifestation of aortic dissection. Laura van Zeggeren, MD, Evert J. Waasdorp, MD, Bart H. van de Worp, MD, PhD, Susanne T. Meijer, MD, PhD, Gert J. de Borst, MD, PhD. Journal of vascular surgery, November 2011.
2. Acute Intramural Hematoma of the Aorta

- Complicated by Spinal Cord Ischemia. Pey-Jen Yu M.D., Hugh A. Cassiere M.D. and Danny Liang M.D. Journal of Cardiac surgery, November 2013.
3. Acute Aortic Dissection Presenting as Painless Paraplegia. Meheroz H. Rabadi MD, MRCPI, FAAN, FANA. Journal of General Internal Medicine, February 2014.

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## 11. Steroid-responsive encephalopathy: Cerebral amyloid angiopathy-related inflammation

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Objective: Recognizing cerebral amyloid angiopathy (CAA)-related inflammation and considering immunosuppressive treatment.

Case: 77 year old Male with history of DM, HTN, HLD, amyloid angiopathy presented with transient confusional spells and new-onset generalized-

tonic-clonic-seizure. He was noted to have left frontal hemorrhage with surrounding inflammation. He was not on chemotherapeutics and BP was 150/90. PRES was less likely. He was deteriorating rapidly in terms of mental status even after anti-epileptics were started. Considering the diagnosis of CAA-related inflammation, he was started on decadron and he showed mild improvement but family members withdrew the care as per patient's wishes.

Results: CT head showed left frontal intraparenchymal hemorrhage. MRI brain w/wo contrast: as mentioned in the figure attached. MRA head and neck were negative. EEG did not show epileptiform activity. CRP was 9.6 and ESR 37.

CSF studies were non-diagnostic (RBC: 2, WBC:

6, protein: 70, glucose: 101.)

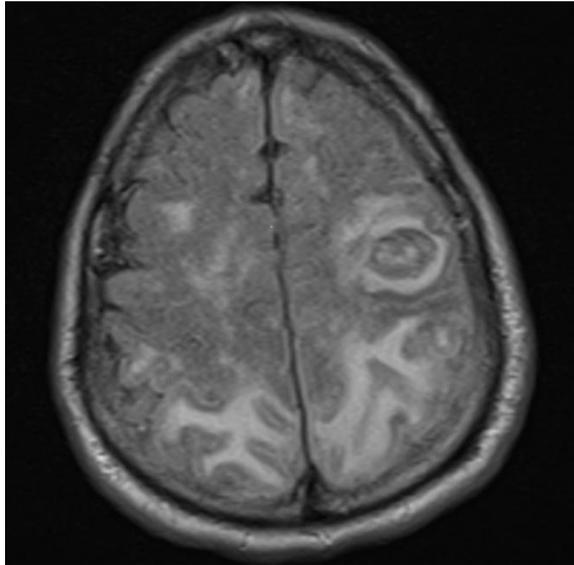


Figure 1 (left) : Numerous foci of susceptibility on the gradient sequence in the cerebral hemispheres and 2 cm hemorrhage within the superior lobe

Discussion: CAA is a common age-related cerebral small vessel disease, characterized by deposition of amyloid-beta peptide in the walls of small arteries and capillaries. Intracranial hemorrhage is a common presentation of CAA. CAA-related inflammation is also seen in few patients and pathological findings related to angiitis of CAA-affected vessels and peripheral inflammation. Common clinical features are acute/subacute cognitive decline, seizures, headache, and stroke-like symptoms. MRI findings include transient leukoencephalopathy. Immunosuppressive treatment has been reported to ameliorate both

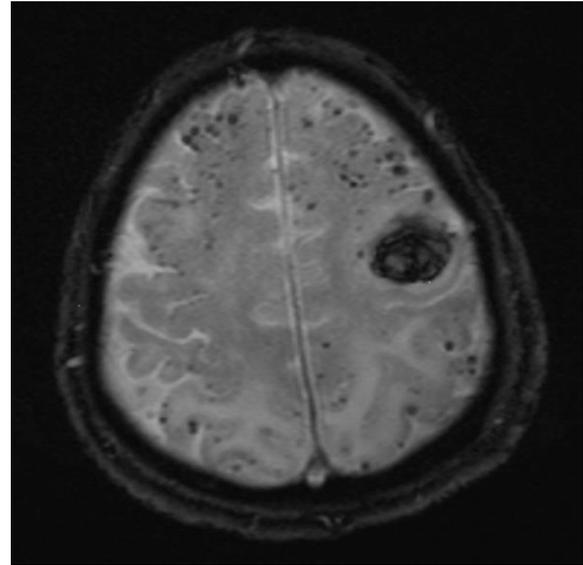


Figure 2 (right): Hyperintensity suggestive of inflammation, noted around the hemorrhage secondary to amyloid.

clinical and radiological symptoms of CAA encephalopathy, although with variable success.

Ref.

1. Clinical manifestations of cerebral amyloid angiopathy-related inflammation. *Annals of Neurology*, 2004
2. Course of cerebral amyloid angiopathy-related inflammation. *American Academy of Neurology*, 2007
3. Amyloid beta-related Angiitis-A case report and comprehensive review of literature of 94 cases. *Seminars of Arthritis and Rheumatism*, 2014

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## 12.Trend in mode of hysterectomy following adoption of a minimally invasive fellowship

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\*\*\*Drexel University College of Medicine: Obstetrics and Gynecology

Objectives: To assess the impact a minimally invasive gynecologic surgery (MIGS) fellowship had on the type of hysterectomies performed at an academic institution.

Methods: This is a retrospective cohort analysis of surgical method for all benign hysterectomies performed annually, beginning with the year prior to the introduction of the MIGS fellowship (2008), and continuing on through 2011. Type of hysterectomy was categorized as being abdominal, vaginal, laparoscopic, or robotic-assisted. The intervention studied in this analysis was the adoption of a MIGS fellowship.

Results: When trending types of hysterectomy, after the implementation of the fellowship, the percentage of abdominal, vaginal, and laparoscopic hysterectomies decreases, while the percentage of robotic hysterectomies drastically increased (11% vs 25%,  $p = 0.02$ ).

Discussion: The literature has demonstrated similar trends in types of hysterectomies since the mid 2000's. Since the FDA approval of the robotic-assisted (RA) platform for hysterectomies in 2005, numbers of abdominal hysterectomies have been declining (1-3). The trend of decreasing laparoscopic hysterectomies was predictable as our surgeons now had an additional platform (robotic-assisted surgery) to achieve a minimally invasive approach. As the percentage of robotic-assisted hysterectomies drastically increased, we saw an overall increase in minimally invasive hysterectomies. The trend in our numbers may have been due to the implementation of a MIGS

fellowship, but also could have been due to the introduction of the da Vinci robot at our institution in 2008. The fellowship and the robot platform has allowed our percentage of maximally invasive (abdominal) hysterectomies to steadily decrease.

Ref.

1. Wright JD et al. Robotic assisted vs laparoscopic hysterectomy among women with benign gynecologic disease. *JAMA*. 2013;309(7):689-698
2. Wright JD et al. Nationwide Trends in the Performance of Inpatient Hysterectomy in the United States. *Obstet Gynecol*. 2013;122(2):233-241
3. Smorgick N et al. The increasing use of robot-assisted approach for hysterectomy results in decreasing rates of abdominal hysterectomy. *Arch Gynecol Obstet*. 2014;289(1):101-10

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### 13. Comparison of Water and Air-charged Transducer Catheters in the Evaluation of Urethral Pressures

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Objective: The aim of this study is to determine if there is a significant difference between air-charged (AC) and water-perfused (WP) urethral pressure profiles (UPP), namely maximum urethral closure pressures (MUCP) in urodynamic studies (UDS).

Methods: This IRB approved prospective study included women above the age of 21 with lower urinary tract symptoms in whom UDS was deemed necessary for diagnostic workup. A dual catheter was formed via a three-way stopcock to simultaneously read water and air pressures within the bladder and urethra. A minimum of 3 consecutive UPPs were measured at a bladder volume of 200 mL and included in analysis. A comparative analysis was performed to acquire MUCP and maximum urethral pressures (MUP). Results: Twenty-five women with a mean age of 57 years were recruited. Correlations are presented between AC and WP pressures. AC pressures are on average 10.1 cmH<sub>2</sub>O (MUP) and 9.9 cmH<sub>2</sub>O (MUCP) higher than WP. A strong correlation was found between AC and WP pressures for the

measures of MUP ( $R^2=0.95$ ) and MUCP ( $R^2=0.96$ ), respectively. A Bland Altman plot displays the reproducibility of consecutive pull-throughs for MUP while comparing AC and WP, indicating the reproducibility is not significantly different.

Conclusion: The single catheter technique decreased alteration of the natural urethral closure mechanism and lessened the risk of catheter cross-talk. UPP measured using AC catheters are highly correlated and clinically equivalent to WP catheters. AC produces MUP/MUCP pressures that are on average 10cmH<sub>2</sub>O higher. Subsequent studies will follow.

Ref.

1. Digesu, G.A. et al. (2014) Are the measurements of water-filled and air-charged catheters the same in urodynamics? *Int Urogynecol J* 25(1):123-30
2. Ghonheim, M.A., Rottenbourg, J.L., Fretin, J., and Susset, J.E. (1975) Urethral Pressure Profile. Standardization of Technique and Study of Reproducibility. *Urology* 5(5):632-7
3. McKinney T.B., Golstein H., Hessami S. (2000) Comparison of Fiberoptic, Microtip, Water and Air-Charged Pressure Transducer Catheters for the Evaluation of Urethral Pressure Profiles. *Int Urogynecol J* 11(Suppl 1):S53.

## 14. Contraceptive Use and Beliefs in Obese Versus Normal BMI Women

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\*\*Drexel University College of Medicine: Department of Obstetrics and Gynecology

**Objectives:** More than one-third of adults in the United States are now obese. As there are known increases in maternal and infant mortality in this population, any association between obesity and contraception constitutes a major health concern. This study aims to determine the differences in contraceptive choices between obese and normal BMI women and to determine the reasoning behind these choices.

**Methods:** Surveys were distributed to pregnant patients at the Women's Care Center focusing on prior contraceptive use and future contraceptive plans, as well as motives and beliefs behind contraceptive choices. After delivery, actual contraceptive use was determined based on reporting at postpartum visits.

**Results:** A total of 58 women were included in the study: 35 in the normal BMI group and 23 in the obese group. Contraceptive use patterns were similar, but women in the obese group were significantly less likely to choose Depo Provera. The pre-pregnancy use of Depo provera in the normal BMI and obese groups was 30.6 versus 60.8 percent, respectively (p value 0.046).

Accordingly, planned post-pregnancy use of Depo provera was 36.4 versus 9.1 percent (p value 0.026). There were no statistical differences in actual contraception use postpartum. Obese women were more likely to believe that weight is a factor when choosing a contraceptive method and both groups were very likely to believe that Depo Provera causes weight gain.

**Discussion:** These findings demonstrate a need for continued education about different types of contraception and side effect profiles in our patient population.

**Ref.**

1. Kaye, K., Suellentrop, K., and Sloup, C. (2009). *The Fog Zone: How Misperceptions, Magical Thinking, and Ambivalence Put Young Adults at Risk for Unplanned Pregnancy*. Washington, DC: The National Campaign to Prevent Teen and Unplanned Pregnancy
2. Scott-Ram R, Chor J, Bhogireddy V, Keith L, Patel A. Contraceptive Choices of Overweight and Obese Women in a Publically Funded Hospital: Possible Clinical Implications. *Contraception*. 2012 Aug; 86(2): 122-6.
3. Schraudenbach A, McFall S. Contraceptive Use and Contraception Type in Women by Body Mass Category. *Womens Health Issues*. 2009 Nov-Dec; 19(6): 381-9

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## 15. Maternal Pre-pregnancy Obesity and Associated Perinatal Outcomes Among Multifetal Gestations

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\*\*Drexel University College of Medicine: Department of Obstetrics and Gynecology, Maternal-Fetal Medicine

**Objectives:** Reports on obesity's effect on multifetal pregnancies are limited and often underpowered. The aim of this study is to determine the risks commonly associated with obesity among a large cohort of multiple pregnancies.

**Methods:** This is a retrospective cohort analysis using the Texas vital records database between 2006 and 2011. We categorized pre-pregnancy BMI according to WHO guidelines. Analysis was

limited to non-anomalous multifetal pregnancies that delivered between 20 and 42 weeks gestation. We compared social-demographic information between obesity classes. Logistic regression was used to estimate the risk of adverse maternal and neonatal outcomes for each obesity class.

**Results:** A total of 35,154 multifetal pregnancies were included in the analysis. Obesity was a significant risk factor for cesarean delivery (OR: 1.39[1.30,1.49]), but protected against blood transfusion, unplanned hysterectomy and ICU admission (OR: 0.51[0.35,0.74], 0.21[0.05, 0.96] and 0.22[0.15,0.31]). Neonates born to obese

women have different outcomes based on their birth sequence. Neonates delivering first were protected against prolonged assisted ventilation and surfactant administration (OR: 0.75[0.67,0.85] and 0.61[0.49,0.75]). Neonates delivering second were more likely to suffer from neonatal death if born to obese women (OR 1.34[1.04,1.72]). The overall neonatal composite outcome for each individual pregnancy was not significantly different among obese women compared to normal weight women (OR 1.01[0.95,1.11]).

Discussion: Obesity increases the risk of cesarean delivery among women with multifetal pregnancies, and is protective against other maternal morbidities. Neonates delivering second are at

increased risk of neonatal death. However, the overall neonatal composite outcomes are similar between obese and normal weight women.

Ref.

1. S Al-Obaidly, J Parrish, KE Murphy et al. Maternal pre-gravid body mass index and obstetric outcomes in twin gestations. *Journal of Perinatology* 2014
2. M Aliyu, A Alio, O Lynch et al. Maternal pre-gravid body weight and risk for placental abruption among twin pregnancies. *Journal of Maternal-Fetal and Neonatal Medicine*, 2009; 22(9)
3. H Salihu, A Alio, V Belogolovkin et al. Prepregnancy obesity and risk of stillbirth in viable twin gestations. *Obesity* 2010; 18

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## 16.Publication Rates of Abstracts Presented over 5 -year periods from the annual AUGS and SUFU meetings

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\*Drexel University College of Medicine: Female Pelvic Medicine and Reconstructive Surgery

\*\* Drexel University College of Medicine: Department of Obstetrics and Gynecology, Urogynecology

Introduction: The annual Society of Urodynamics, Female Pelvic Medicine, and Urogenital Reconstruction (SUFU) and the American Urogynecologic Society (AUGS) meetings attract thousands of professionals. Each year, hundreds of abstracts are presented. It is important to evaluate how many of these abstracts withstand the strict scrutiny required for publication in peer-reviewed journals.

Methods: Abstracts presented at the AUGS meetings from 2006 to 2010 were analyzed for subsequent publication. Abstracts were considered published if at least one author and at least one conclusion in the presented abstract were included in the published paper. Publication rates, time to publication, methodology and journal impact factor (JIF) were calculated. Results: A total of 1064 abstracts were analyzed from annual AUGS meetings. 49% went on to successful publication. Average journal impact factor (JIF) for all publications was 2.9 ( $\pm 2.667$ ). Publications appeared in 69 different journals and the average time to publication was

13.79 months. 612 abstracts were presented from 2008 through 2012 at the annual SUFU meetings, of which 140 were podium presentations. Of these, 80 (42%) went on to be published peer reviewed journals. The average time to publication was 17.4 ( $\pm 12$ ) months, in 17 journals and the average JIF was 3.157.

Conclusions: The publication rate for abstracts presented is roughly less than half, similar to published results from other national meetings. The average JIF was slightly higher than other national meeting studies. Attendees should take caution when referencing or concluding from abstracts not yet subjected to the peer review process required for publication.

Ref.

1. Hoag, Chris C.; Elterman, Dean S.; MacNeily, Andrew E. Abstracts presented at the American Urological Association annual meeting: determinants of subsequent peer reviewed publication. *The Journal of Urology* 2006;176:2624-2629
2. Weale, AR; Edwards, AG; Lear, A; et al. From meeting to peer-review publication presentation to publication – a UK review. *Ann R Coll Surg Engl* 2006; 88(1): 52.
3. Abzug, Joshua M; Osterman, Meredith; Rivlin, Michael; et al. Current rates of publication for

podium and poster presentations at the American Society for Surgery of the Hand annual meetings. Arch Bone Jt Surg 2014; 2(3): 199-202.  
4. Cartwright, Rufus; Khoo Abigail Kate; Cardozo,

Linda. Publish or be damned? The fate of abstracts presented at the international continence society meeting 2003. Neurology and Urodynamics 2007; 26: 154-157

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## CASE REPORTS

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### 1. An Acute Presentation of Cutaneous Parasite: *Tungae Penetrans*

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\*\*Drexel University College of Medicine: Department of Podiatry

**Case:** A 25 year old male patient presented with a two weeks old painful lesion on his left foot. He denied any constitutional symptoms or injury. He recently traveled to South America where he recalls ambulating barefoot. Physical exam revealed a 0.5 cm black lesion with a central opening located plantar to the first metatarsophalangeal joint (Fig.1) The lesion was surgically resected and offloaded. Histochemical evaluation with acid-Schiff and Gomori's silver stain were negative for hyphae (Fig.2). Biopsy result of collapsed carcass and arthropod parts indicated as tungiasis. The patient was placed on oral antibiotics with complete resolution of his symptoms during his follow-up visits.

**Discussion:** Tungiasis is a zoonotic infection caused by the gestating female species of *Tunga penetrans* (TP) Prevalent in the Caribbean, equatorial Africa and South America (1). The parasite infiltrates the host skin on direct contact and remains embedded for four to six weeks (2). During which, it produces hundreds of eggs and increases in size (2). It communicates with the external environment through a cutaneous opening which is also used to lay eggs. Symptoms such as pruritus, pain and local infection intensifies as the parasite develops subcutaneously (3). Lesions usually contain anus, genital opening and Ref.

1. Cestari S, Ramos-e-Silva M. Tungiasis and myiasis. Clinics in Dermatology. 2007; 25: 158-164

2. Feldmeier H, Keyzers A. Tungiasis – A Janus-faced Parasitic skin disease. Travel Medicine and Infectious Disease. 2013; 11: 357-365.

3. Feldmeier H, Eisele M, Sabóia-Moura RC, Heukelbach J. Severe tungiasis in underprivileged communities: case series from Brazil. Emerg Infect Dis. 2003; 8:949-55.

breathing spiracles (2). Although common on the feet, ectopic areas include thighs, buttocks and hands. Treatment includes occlusion of lesion, surgical resection or topical medicine. However it can resolve spontaneously after the death of the parasite. Bacterial superinfections and wart-like deformities are common complications for children and elderly (4).



Figure 1

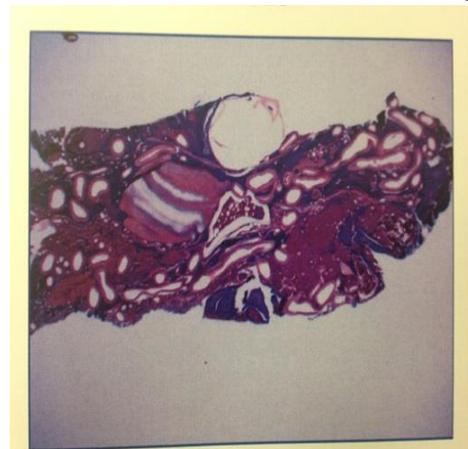


Figure 2

4. Ferreira LA, Piazza AA, Junior WB, Souza EM. Tunga Penetrans as a traveler's disease. *Travel Medicine and Infectious Disease*. 2009; 7: 381-382

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## 2.WHERE IS THE GAP COMING FROM? A CASE REPORT

Myriam Vela-Ortiz, MD\*, Guan Yanfang, MD\*, Singh Sukhminder, MD\*, Vinay Rupashree, MD\*\*, Richard Snyder, MD\*\*\*

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Case: A 52 yo AA male with a history of alcohol abuse presented with nausea and vomiting. He reported consuming a bottle of Listerine daily for the past two months. On admission vitals were stable. Labs demonstrated pH of 6.9, pCO<sub>2</sub> 13 mmHg. Sodium was 137 meq/L, potassium 4.6 meq/L, chloride 105 meq/L, carbon dioxide 7 meq/L, BUN 13 mg/dl, creatinine 1.5 mg/dl, and glucose 111 mg/dL. Lactic acid was 16.5 mmol/L, lipase 46 U/L, AST 60 U/L and ethanol level 80 mg/dL. His ethylene glycol and methanol levels were negative. Serum osmolality was 352; his calculated osmolality was 299 with an osmolar gap of 53. Anion gap was 31. Labs demonstrated high anion gap metabolic acidosis and an elevated osmolar gap felt to be due to the over consumption of Listerine. The concentration of ethanol in Listerine is approximately twenty-seven percent; this was the main contributor to the osmolar gap,

but lactic acid can also increase osmolar and anion gap.

Discussion: Consumption of large doses of the phenolic compounds such as thymol, eucalyptol, menthol as well as methyl salicylate have been reported in the medical literature to cause a metabolic acidosis while not increasing the osmolar gap. Clinicians should have a high index of suspicion for Listerine use in anyone with a history of ethanol abuse who demonstrates both a gapped metabolic acidosis and osmolar gap. Our patient was started on intravenous bicarbonate and aggressive fluid resuscitation, which resulted in reversal of the acidosis and acute kidney injury.

Ref.

1. Arora A. The 'gap' in the 'plasma osmolar gap'. *BMJ Case Rep*. 2013 Aug 8;2013
2. Lachenmeier DW, Monakhova YB, Markova M, Kuballa T, Rehm J. What happens if people start drinking mouthwash as surrogate alcohol? A quantitative risk assessment. *Food Chem Toxicol*. 2013 Jan;51:173-8

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## 3.A CASE OF METABOLIC ALKALOSIS IN CHRONIC KIDNEY DISEASE

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\*Easton Hospital: Medicine

\*\*Easton Hospital: Department of Medicine, Division of Nephrology

Case: 44 year old male Caucasian with PMH significant for diabetes type 1, stage IV chronic kidney disease, and gastroparesis came into the emergency department complaining of nausea and vomiting for 2 days. Vitals were stable, labs showed WBC at 17.5, hemoglobin 14.7, platelets 534, BUN 95 creatinine 7.98. Sodium 125, potassium 2.8, chloride 65, and anion gap 25. His pH was 7.72, pCO<sub>2</sub> of 27.3, pO<sub>2</sub> of 106, bicarbonate 34.7, base excess of 15.2, lactic acid 2.9, Salicylate level was low. The severe metabolic and respiratory alkalosis was thought to be from

profound vomiting, and tachypnea on admission. The patient was dialyzed for 2.5 hours on a 130 sodium, 4 potassium, 33 bicarbonate bath. After dialysis his pH was 7.37, pCO<sub>2</sub> 53.2, bicarbonate 30.3 on room air, sodium 129, chloride 76, stable vitals with mild nausea.

Discussion: Not enough literature is available regarding severe metabolic alkalosis in patients with Chronic Kidney Disease (CKD) or ESRD. Our case portrays an impending case of metabolic and respiratory alkalosis, in a dialysis naïve patient whom underwent successful urgent renal replacement treatment due to the impending risk of seizures and ventricular arrhythmias that can happen with a pH above 7.6. High bicarbonate

concentration in renal disease patients can be secondary to inability of the kidney to get rid of bicarbonate, malnourishment and a low rate of acid production. Most patients receiving hemodialysis now are dialyzed with a dialysate containing bicarbonate in high concentration, more information seems to be necessary regarding dialysis parameters in this special population.

Ref.

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#### 4. Prinzmetal's Angina leading to Infarction of the Cerebral Vasculature

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Introduction: Prolonged and intermittent vasospasm of cerebral vasculature due to various causes leads to acute cerebral ischemia which sometimes climaxes to the full blown stroke in unfortunate cases.

Case: A 51year old male presented with multiple episodes of limb weakness. He first noticed it in his left leg when he was getting out of his car causing him to fall. He promptly gained back his function. Six hours later, he developed similar symptoms which necessitated an ER visit. Upon arrival, his motor function returned to normal but he developed profound weakness again two hours later. In addition, he also lost power in his left hand, and this time it persisted. Motor power 2/5 in left lower extremity and 4/5 in left lower extremity. BP was 182/108 mmHg and toxicology was positive for cocaine. Brain CT scan, carotid doppler and echocardiogram were normal. MRI of the brain revealed evidence of infarction in the right anterior and middle cerebral arteries. He was treated with aspirin, lisinopril, amlodipine and pravastatin. He went for rehabilitation and substance abuse program and made a full recovery.

Discussion: Cocaine abuse accounts for 40% of all ER visits related to illicit drug abuse. Despite research, the exact mechanisms of cocaine-induced neurological complications are not clearly defined. Vasospasm, cerebral vasculitis, increased platelet aggregation and hypertensive episodes have been theorized as possible mechanisms. Our case describes cocaine-induced Prinzmetal's angina like vasospasm leading to stroke in a person without vascular risk factors. This highlights vasospasm being the prominent pathophysiological mechanism for cocaine associated stroke.

Ref.

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#### 5.A Rare Case of Quadricuspid Aortic Valve

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INTRODUCTION: Quadricuspid aortic valve (QAV) is a rare congenital aortic valve (AV) anomaly. QAV cases commonly manifest in the 5th or 6th decade of life with aortic regurgitation (AR). Its prevalence is estimated to be around 0.013-

0.043% in the general population and has 1% incidence when reviewed in patients requiring surgery for isolated AR. Prognosis is good in QAV patients if AR is an isolated phenomenon and does not coexist with other congenital abnormalities.(1-4)

CASE: A 45-year-old AA M with a PMHx of HIV (CD4-562), Kaposi sarcoma treated with chemotherapy and asthma presented to the ED with sharp midsternal non-radiating chest pain (CP) without any relief or exacerbation for a day. Physical exam revealed a HR- 60 bpm and BP- 109/45 mmHg, II/VI decrescendo high-pitched blowing murmur heard at the left sternal border. The remainder of his physical exam was unremarkable. UDS was positive for cocaine, cardiac enzymes were negative, ECG revealed NSR at 70 bpm with no ST-segment changes. CTA of the chest did not reveal pulmonary embolism or aortic dissection. A transthoracic echocardiogram (TTE) revealed an EF of 45-50%, QAV and mild-moderate AR (Fig. 1 & 2). CP resolved within 24



Figure 2 TTE parasternal long axis view showing mild-moderate AR

hr. He was counseled on abstaining from drug use and arranged a follow-up with a cardiologist. DISCUSSION: This case illustrates the classical clinical findings of QAV with AR. A close follow-up with periodic echocardiography is required for worsening AR; early surgical intervention may be warranted to prevent late complications.(5)



Figure 1 TTE parasternal short axis view showing QAV during A. Diastole and B. Systole. 1-NCC, 2-RCC, 3-Accessory Cusp, 4- LCC

Ref.

1. Franco A, Gabriel S, Ruehm SG. The quadricuspid aortic valve. *Radiology Case*. 2014; 8(11):25-29.
2. Feldman BJ, Khandheria BK, Warnes CA, Seward JB, Taylor CL, Tajik AJ. Incidence, description and functional assessment of isolated quadricuspid aortic valves. *Am J Cardiol*. 1990; 65:937-8.
3. Olson LJ, Subramanian R, Edwards WD. Surgical Pathology of Pure Aortic Insufficiency: a Study of 225 Cases. *Mayo Clin Proc*. 1984; 59:835-41.
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## 6. Mixed Atrial Septal Defect: an uncommon but dangerous congenital defect.

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**Introduction:** Atrial septal defects (ASD) are uncommon anomalies, with an incidence of 10-20%. While often initially asymptomatic, they have the potential over time to cause hemodynamic complications. The presence of a mixed defect (defects in two or more atrial septal zones) is relatively rare and present in only 7% of ASDs.(1)

**Case:** A twenty-year-old Chinese woman was referred to the cardiology office for recurrent syncope. Initial evaluation with electrocardiogram revealed sinus arrhythmia with an incomplete right bundle branch block. Transthoracic echocardiogram (TTE) was notable for a significantly dilated right atrium and right ventricle, with a left to right color Doppler flow across the interatrial septum consistent with a secundum ASD (Fig. 1). Further evaluation with transesophageal echo (TEE) confirmed the suspected ostium secundum defect and also revealed a sinus venosus ASD at the junction of the SVC and right atrium (Fig. 2). Subsequent right heart catheterization showed pulmonary blood flow to systemic blood flow ratio ( $Q_p/Q_s$ ) of 3.9, consistent with a large shunt.

**Discussion:** This patient displayed defects in two separate zones of the atrial septum, thereby demonstrating a mixed defect. Her relatively young age at presentation was attributed to the magnitude of the shunt, as many adults with congenital ASD do not present until the fifth decade of life. Given the presence of the concomitant sinus venosus ASD, percutaneous closure was not feasible and she was referred for surgical intervention. Prognosis is directly correlated with size of ASD, degree of right heart dilatation, and timely surgical intervention.

Ref.

1. Gary Webb, MD; Michael A. Gatzoulis, MD, PhD; Congenital Heart Disease for the Adult Cardiologist *Circulation*. 2006; 114: 1645-1653

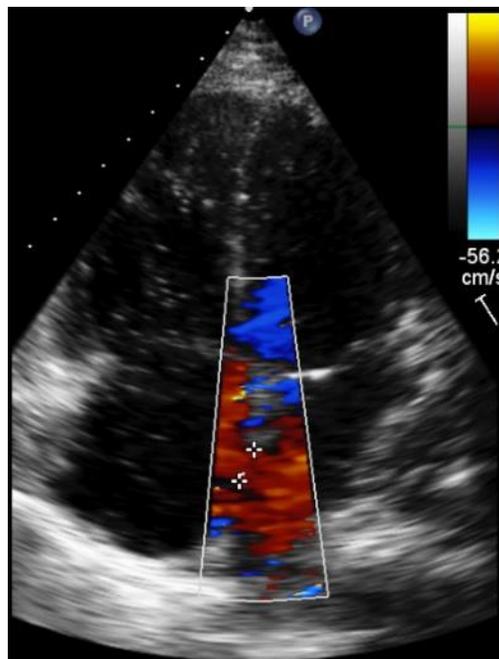


Figure 1: TTE: Apical 4-Chamber View; Color Doppler across the 0.9cm Ostium Secundum

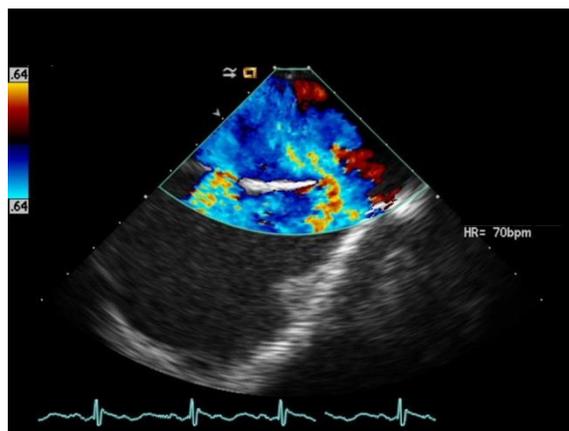


Figure 2 Bicaual view demonstrating both the Ostium Secundum (Right) and the Sinus Venosus (Left)

2. John J, Abrol S, Sadiq A, Shani J.; Mixed Atrial Septal Defect: Coexisting Ostium Secundum and Sinus Venosus Atrial Septal Defect. *J Am Coll Cardiol*. 2011;58(5):e

## 7. Early Pregnancy Associated Cardiomyopathy in a Pre-term Twin Delivery at 28 weeks of Gestation

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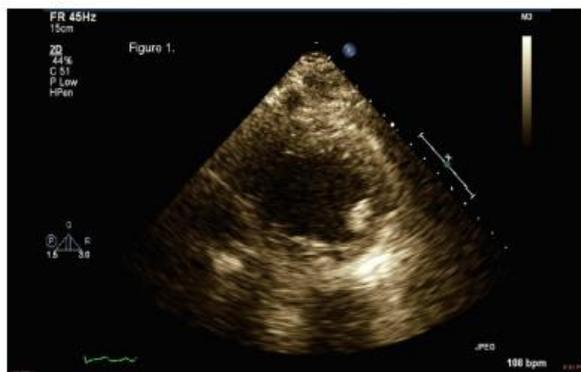
**Introduction:** Early Pregnancy associated cardiomyopathy (ePACM) is an infrequently encountered but potentially critical condition occurring in women earlier in gestation, as opposed to traditional definition of peripartum cardiomyopathy (PPCM).

**Case:** A 31-year-old Caucasian primigravida presented to the ER at 28 weeks gestation with vaginal spotting and uterine contractions. Patient underwent emergency C-section and viable male and female neonates were delivered. Twelve hours after the C-section, the patient acutely developed shortness of breath with desaturation. An echocardiogram (figure 1) showed ejection fraction (EF) of 16% with severe global hypokinesis of the left ventricle and right ventricular systolic dysfunction. A diagnosis of ePACM was made. Repeat echocardiogram after 4 days of medical management showed an EF of 35% with moderate left ventricular global hypokinesis (figure 2). The

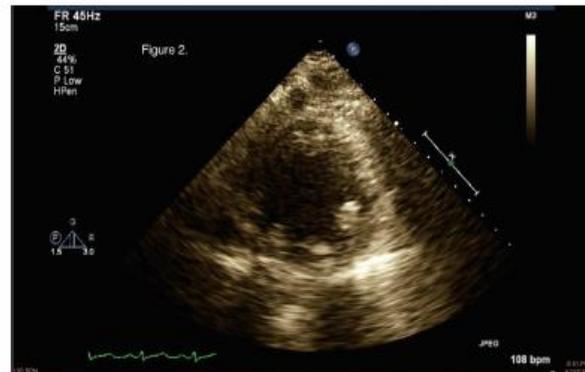
patient had stable course subsequently.

**Discussion:** PPCM is rarely seen before 36 weeks of gestation [1]. In our patient the presentation occurred at 28 weeks of gestation. This is an unusual gestational age for presentation of PPCM and was described by Elkayam et al. and termed ePACM. [2] Also the interesting association between PPCM and twin pregnancies may support an autoimmune mechanism for PPCM. Ansari et al, [3] found high titers of autoantibodies against normal human cardiac tissue proteins in the sera of PPCM patients that were not present in patients with idiopathic cardiomyopathy.

This finding may be due to hematopoietic lineage cell traffic(chimerism) from the fetus to the mother during gestation, which is increased in twin pregnancies thus explaining PPCM in twin pregnancies [4].



End Diastole



End Systole

Figure 1: Echocardiogram Images Day 1



End Diastole

Figure 2: Echocardiogram Images Day 4



End Systole

Ref.

1. Lampert MB, Lang RM. Peripartum cardiomyopathy. *Am Heart J* 1995;130:860–70.  
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## 8. Drug Eluting Balloon: The latest tool in the armamentarium of peripheral vascular interventions.

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Introduction: Patency following lower extremity peripheral interventions remains a challenge. Patency rates following plain old balloon angioplasty (POBA), bare metal (BMS) and drug eluting stents (DES) are reported in the range of 40%, 65% and 75% respectively. (1-3) Restenosis in DES is caused by inflammation of the vessel wall to material left behind. The Drug Eluting Balloons (DEB) are new FDA approved technology that avoid inflammation by leaving nothing behind at the lesion site.

Case report: A 63yo female with Coronary Artery and Peripheral Arterial Disease presented with worsening claudication. Three years earlier she received overlapping BMS (6.0mmx100mm and 6.0mmx150mm) in her left superficial femoral artery (SFA). Angiography this time revealed diffuse severe in-stent restenosis (ISR). The lesion

was treated with DEB angioplasty with an excellent result.

Discussion: DEB offers homogeneous drug delivery into the endothelium and avoids inflammation to the vessel. The balloon is coated with the drug paclitaxel that inhibits cell division, cell growth and intimal hyperplasia. The Lutonix drug coated balloon is the first such FDA approved device. Anatomically difficult lesions can be treated without the fear of jailing the branch vessel or causing stent fracture. Studies have shown the superiority of DEB over POBA in treating lesions as well as ISR in femoral artery. In such studies the 1 year patency rates are comparable to patency rates of DES. (4) Comparison of DES and DEB are still lacking. Nonetheless, with comparable patency rates to DES, DEB offer a very valuable tool in challenging lesions as mentioned above.



Figure 1 Left Superior Femoral Artery, before procedure



Figure 2 Left Superior Femoral Artery after DEB angioplasty

Ref.

1. Deloose K., Lauwers K., Callaert J., et al: Drug-eluting technologies in femoral artery lesions. J Cardiovasc Surg (Torino) 2013; 54: pp. 217-224.
2. Dake M.D., Ansel G.M., Jaff M.R., et al: Paclitaxel-eluting stents show superiority to balloon angioplasty and bare metal stents in femoropopliteal disease: twelve-month Zilver PTX

randomized study results

3. Liistro F, etal. Paclitaxel-Eluting Balloon vs Standard Angioplasty to Reduce Recurrent Restenosis in Diabetic Patients with In-Stent Restenosis of the Superficial Femoral and Proximal Popliteal Arteries: the DEBATE-ISR study. J Endovasc Ther .2014;21:1-8

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## 9.MDMA (Ecstasy) Cardiotoxicity

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Introduction:

MDMA(methylenedioxymethamphetamine) intoxication is characterized by central nervous system toxicity, hypertension, tachycardia, hyperthermia and low blood sodium (1). It infrequently presents with cardiotoxicity which may manifest as cardiomyopathy, acute myocardial infarction/necrosis, arrhythmia, aortic dissection and cardiac tamponade (2)(3).

Case: A 40 year old man presented with substernal chest pain, diaphoresis and dizziness. He has had previous episodes of lesser intensity for

over two years. He denied drug abuse. On examination he was agitated, hypertensive and tachycardic. Electrocardiogram showed sinus tachycardia, 3-lead T wave inversions and one lead ST elevation. Three sets of troponins were negative. Echocardiogram revealed ejection fraction of 35-40% with left ventricular dilatation and global hypokinesia. Persantine stress test showed normal perfusion with no reversible defects suggestive of ischemia. Private discussions with patient revealed MDMA abuse before partying with recent overdose. He was given lorazepam with marked improvement and was subsequently discharged on congestive heart failure regimen with follow up echocardiogram scheduled. Discussion: MDMA is a sympathomimetic which causes release of endogenous serotonin and catecholamine and blocks their reuptake (4). A review of available literature indicates that oxidative/nitrosative stress plays an important role

in the cardiotoxic actions of MDMA. The repeated binge use of ecstasy produces eccentric LV dilatation and diastolic dysfunction accompanied by oxidative modification of mitochondrial proteins and/or proteins involved in excitation-contraction coupling (5). This case emphasizes the importance of a complete history which impacts management for chest pain resulting in delivery of appropriate therapy. Very few cases of MDMA cardiotoxicity have been reported.

Ref.

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Methylene 3, 4 dioxymethamphetamine-induced acute myocardial infarction. *Ann Emerg Med* 2003; 42:759

3. Duflou J, Mark A. Aortic dissection after ingestion of "ecstasy" (MDMA). *Am J Forensic Med Pathol* 2000; 21:261
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5. Shenouda SK, Carvalho F, Varner KJ. The cardiovascular and cardiac actions of ecstasy and its metabolites. *Current Pharmaceutical Biotechnology* 2010; 11, 470-475

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## 10.A Case of Gamma-Hydroxybutyrate (GHB) Withdrawal

**Case Report:** A 33-year-old male was admitted to the hospital for ankle surgery. On hospital day 7, the patient had a change in mental status. He was wearing sunglasses, shadow boxing in the air, and not responding to direct questions. Initial vital signs include: temperature 98°F, heart rate 111 beats per minute, blood pressure 125/80 mmHg, respiratory rate 22 breaths per minute, pulse oximetry 98% on room air. ECG was remarkable for sinus tachycardia. Remarkable laboratory results include an elevated CPK 384 IU/L. It was discovered that he was surreptitiously taking GHB while in the hospital. He was placed on a 1:1 and shortly thereafter began to experience withdrawal symptoms, which progressed to delirium. The patient was treated with lorazepam and was discharged on a lorazepam taper.

**Discussion:** GHB exerts agonist effects on GHB specific receptors and on GABA-B receptors resulting in sedation and depressed mental status (1). Chronic GHB use results in tolerance and downregulation of inhibitory GABA and GHB receptors(1). Cessation of use leads to unopposed excitatory neurotransmission and withdrawal syndrome. GHB withdrawal typically manifests within 1-6 hours (2,3). Initial symptoms can include anxiety, tremor, diaphoresis, tachycardia, nausea, vomiting and insomnia (2). Withdrawal may

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progress rapidly to refractory agitation, hallucinations, delirium, and death within 24 hours. Clinical manifestations are similar to alcohol withdrawal syndrome except that autonomic instability is mild or absent and psychomotor agitation and delirium may be prolonged (3). Treatment includes use of benzodiazepines for psychomotor agitation and use of propofol, dexmedetomidine or non-depolarizing neuromuscular blockade for refractory toxicity (3,4).

Ref.

1. Nelson LS et al. Neurotransmitters and Neuromodulators. In: Goldfrank LR, Flomenbaum NE, Lewin NA, eds. *Goldfrank's Toxicologic Emergencies* 9th ed. New York: McGraw-Hill, 2009: 209-223.
2. Dyer JE, Roth B, Hyma BA. Gamma-hydroxybutyrate withdrawal syndrome. *Annals of Emergency Medicine*. 2001;37(2):147-53.
3. Nelson LS et al. Gamma Hydroxybutyric Acid. In: Goldfrank LR, Flomenbaum NE, Lewin NA, eds. *Goldfrank's Toxicologic Emergencies* 9th ed. New York: McGraw-Hill, 2009:1154.
4. Tarabar AF, Nelson LS. The gamma-hydroxybutyrate withdrawal syndrome. *Toxicological reviews*. 2004;23(1):45-9.

## 11. Toxicity from Ingestion of a Transdermal Nicotine Patch

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**Case Report:** A 23-year-old male admitted to the psychiatric ward of a university hospital ingested a 14 mg nicotine patch in a suicide attempt. One hour post- ingestion he complained of abdominal pain, nausea, vomiting, palpitations and diffuse tremors. His blood pressure was 133/90 mmHg and his heart rate was 137 beats per minute (bpm). Whole bowel irrigation was initiated with polyethylene glycol and he was administered 1 liter of normal saline intravenously. He was placed on continuous cardiac monitoring. His heart rate and blood pressure peaked 8 hours post-ingestion at 153 bpm and 140/90 mmHg, respectively. His symptoms resolved 20 hours post-ingestion.

**Discussion:** Transdermal nicotine patches (TNP) are designed to deliver 7, 14, and 21 mg of nicotine over 24 hours. The TNP reservoir contains 36 - 114 mg of nicotine per patch.<sup>1</sup> If the integrity of the patch is damaged or the patch is ingested the full depot of nicotine may be absorbed. The lethal dose (LD50) for

nicotine in humans is estimated to be 1 mg/kg<sup>1</sup>. Therefore, ingestion of a single TNP is potentially lethal in both adults and children. Symptom onset after ingestion of nicotine is 30 - 90 minutes<sup>2</sup>. Symptoms of acute nicotine toxicity are divided into early and late symptoms. Early symptoms include: nausea, vomiting, salivation, abdominal pain, hypertension, tachycardia, agitation, dizziness, headache and seizures. Late symptoms include: diarrhea, hypoventilation, bradycardia, hypotension, dysrhythmias, apnea and paralysis<sup>3,4</sup>.

Ref.

1. Salomon M. Nicotine and tobacco preparations. Goldfrank's Toxicologic Emergencies 8th ed New York, NY: McGraw-Hill 2006:1221-30

2. Smolinske SC, Spoerke DG, Spiller SK, Wruk KM, Kulig K, Rumack BH. Cigarette and nicotine chewing gum toxicity in children. Human toxicology 1988;7:27-31

3. Woolf A, Burkhart K, Caraccio T, Litovitz T. Childhood poisoning involving transdermal nicotine patches. Pediatrics 1997;99:E4

4. Woolf A, Burkhart K, Caraccio T, Litovitz T. Self-poisoning among adults using multiple transdermal nicotine patches. Journal of toxicology Clinical toxicology 1996;34:691-8

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## 12. An Interesting Case of Undifferentiated Metabolic Acidosis

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**Case:** A 15 year-old male with no past medical history presented to the emergency department (ED) with abdominal pain. While in the ED, he developed status epilepticus. He was found to have a metabolic acidosis, with a pH of 7.07, an anion gap of 41 and a serum bicarbonate less than 5 mEq/L. There was no ketosis. The calculated osmolal gap was 25, a lactate was 6 mmol/L, and ethanol, iron, salicylate, and acetaminophen levels and a urine drug screen were negative. There was no history of ingestions or exposures. He was treated empirically with fomepizole and pyridoxine for possible toxic alcohol or isoniazid toxicity. The patient empirically underwent hemodialysis. Seventy-two hours after presentation a methanol

level resulted at 47 mg/dL. The patient subsequently admitted to drinking two cups of windshield washer fluid in an attempt to get high. The patient was discharged to a rehabilitation facility with mild cognitive deficit, Parkinsonism, and a visual deficit.

**Discussion:** Metabolic acidosis has a wide differential. In addition to etiologies unrelated to poisonings, various toxic exposures are potentially implicated. Initial presentation and laboratory studies may be of limited utility given the lack of specificity associated with an elevated or normal osmolal gap. In the absence of a readily apparent non-toxicological cause, it may be prudent to treat patients with significant metabolic acidosis empirically for toxic alcohol, isoniazid, and cyanide toxicity as diagnostic testing for serum concentrations of these compounds are typically

delayed, and antidotes for these substances are relatively benign.

Ref.

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2. Brent J. Fomepizole for the treatment of pediatric ethylene glycol, butoxyethanol, and methanol poisonings. *Clin Toxicol* 2020;48:401-406
3. Lepik KJ et al. Adverse drug events associated with the antidotes for methanol and ethylene glycol

poisoning: a comparison of ethanol and fomepizole. *Ann Emerg Med* 2009;53: 439-450

4. Howland MA. Pyridoxine. In: Goldfrank LR, Flomenbaum NE, Lewin NA, eds. *Goldfrank's Toxicologic Emergencies*. 9th ed. New York: McGraw-Hill, 2009:845-848
5. Nelson LS et al. Principles of managing the acutely poisoned or overdosed patient. In: Goldfrank LR, Flomenbaum NE, Lewin NA, eds. *Goldfrank's Toxicologic Emergencies*. 9th ed. New York: McGraw-Hill, 2009:37-44

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### 13.Green Potatoes Lead to Solanine Poisoning

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CASE: A 38-year-old man presented to the emergency department by emergency medical services after ingesting a baked green potato the previous night. The patient complained of abdominal cramping, nausea, vomiting, and diarrhea, four hours after ingesting the potato. The patient's vitals on arrival were heart rate 111 beats/minute, blood pressure 122/43 mmHg, respirations 20 breaths/minute, and pulse oximetry 100% on room air. Physical examination was remarkable for diffuse abdominal tenderness. He was administered 4mg intravenous ondansetron for nausea and 3 liters of normal saline for dehydration. His basic metabolic panel and complete blood count were within normal limits. The patient was discharged from the ED after four hours of supportive care with a diagnosis of food poisoning.

DISCUSSION: The common potato (*solanum tuberosum*) is in the plant family of Solanaceae that produce solanine, a toxic glycoalkaloid. The average content of solanine in a potato is 8 mg per 100 g, and is mostly concentrated in the skin (1). This concentration of solanine rarely causes clinical illness, as the minimum level of toxicity in

humans is estimated to be 2 mg/kg (2). Potatoes may turn green when they are exposed to sun-light due to increased chlorophyll production. Although chlorophyll is nontoxic, the process promoting chlorophyll production also promotes solanine production (3). Solanine toxicity most often lead to nausea, vomiting, diarrhea, and abdominal cramping. Neurologic symptoms are less common and include hallucinations, delirium, paralysis, and coma (4). Historically, fatal cases of solanine toxicity have been reported (5).

Ref.

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5. Smith, K. A. "Horror Tales of Potatoes That Caused Mass Sickness and Even Death." *Smithsonian*. Smithsonian.com, 21 Oct. 2013

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### 14.A "Knockdown" Gas Exposure

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CASE: A 49-year-old male presented to the emergency department after abruptly losing consciousness while working in an oil refinery

where hydrogen sulfide gas was present. His co-workers safely retrieved him within 10 minutes and administered supplemental oxygen. He gradually regained consciousness and reported abdominal pain, vomiting, generalized weakness and eye irritation. He remained amnesic to the event. Laboratory findings revealed a lactic acidosis and leukocytosis. He was admitted to the intensive care unit and his symptoms resolved within 48 hours. DISCUSSION: Hydrogen sulfide (H<sub>2</sub>S) is a colorless gas with a rotten egg odor. Occupational sources include petroleum refineries, sewage treatment facilities and manure pits (1). H<sub>2</sub>S is a cellular asphyxiant and a mucous membrane irritant (2). Clinical manifestations are dose-dependent and include keratoconjunctivitis (“gas eye”), corneal ulceration and scarring, upper airway irritation, headache, nausea, vomiting, olfactory nerve paralysis, mental status change, seizures, acute lung injury and cardiovascular collapse. The classic “knockdown” description refers to rapid onset of unconsciousness at high concentrations, which may result in traumatic injuries (2,3). Neuropsychiatric sequelae may occur after acute exposure (2-4). No confirmatory laboratory test is readily available. Management includes removal from source while ensuring rescuer safety, supplemental oxygen administration, and supportive care. Treatment with sodium nitrite, hydroxocobalamin, and hyperbaric

oxygen therapy may be considered but evidence of benefit is limited (2).

CONCLUSION: H<sub>2</sub>S is a potentially lethal occupational exposure. In the appropriate setting, it is important to consider H<sub>2</sub>S exposure in the differential diagnosis of a patient with abrupt loss of consciousness.

Ref.

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## 15. Self-Induced Abortion By A Modern Day Mechanism

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Introduction: Self-induced abortion is a rarely encountered circumstance. With increasingly limited access to safe pregnancy termination care, women's healthcare providers must become aware of its presentation and ethical implications. Case: A 20 year-old G3P1011 with unsure dating was transferred from an outside hospital for presumed preterm labor. Bedside ultrasound estimated her gestation at 27 weeks. Upon arrival, uterine contractions were regular and fetal status was reassuring. Further questioning revealed that this pregnancy was undesired. She revealed that this was the second time she'd self-administered Cytotec 200mcg per vagina this pregnancy with the

intent to end it. The off-label cervical ripening agent had been ordered online. After placing the medication, intense contractions began so she sought medical care. Labor quickly progressed, resulting in an uncomplicated spontaneous vaginal delivery of a male infant (1070g, APGAR scores 4/7). He was admitted to the NICU for prematurity and respiratory distress. Postpartum, the patient exhibited no remorse for self-inducing her unwanted pregnancy leading to the birth of her premature son. He thrived and was discharged in her care on day of life #76 after being cleared by Social Services.

Discussion: The definition of illegal abortion according to Title 18§§3201-3220 includes: “...(2) failure to meet standards for legal abortion; (3) using any means to cause the death of an unborn

child...(5) without making diagnosis of gestational age". This case illustrates how a mother purposefully attempted, yet failed, to induce her own illegal abortion. As providers, we must consider the ethical issues highlighted here as well as our legal responsibilities.

Ref.

1. CDC. Abortion surveillance—United States, 2011. *MMWR* 2014;63(SS-11);1-41.
2. Abortion Control Act, 18 Pa.C.S.A. §§3201-3220 (1989).

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## 16.An Unusual Presentation of Metastatic Cervical Cancer

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**Introduction:** Advanced-stage cervical cancer is an uncommon yet challenging disease to manage. The 5-year survival rate is approximately 57% and surveillance is important to identify the 20-40% of those who will recur. Local recurrence is most common, but occasionally it will be distant from the original disease site.

**Case:** Here we examine a case of a 51 year old African American female who first presented to our facility after being diagnosed and treated for FIGO Stage IIIB cervical carcinoma approximately 2 years prior. She received platinum-based chemotherapy and pelvic radiation, but not brachytherapy. Her course between treatment and presentation was complicated by bowel obstruction due to radiation enteritis, which resolved with bowel resection. At initial presentation she noted she had been struggling with chronic weight loss, anorexia, and diarrhea. Throughout her course she

continued to have difficulty maintaining weight due to nausea, vomiting, and diarrhea. The patient then presented with a painful mass in her left upper arm. MRI showed a solid, well-circumscribed mass deep to the biceps and brachialis, abutting the humerus and concerning for sarcoma. A biopsy was taken in the operating room and a hard, fibrous mass was observed deep within the biceps muscle containing purulent fluid. Pathological report revealed atypical cells which tested positive for p16, indicating recurrent, metastatic cervical cancer to the left upper extremity. PET/CT showed no other areas concerning for metastasis. The plan is to treat the lesion with radiation at a dose of 60 Gy in 30 fractions with weekly cisplatin.

Ref.

1. Karlan, B. (2012). *Gynecologic oncology: Clinical practice & surgical atlas*. New York: McGraw-Hill Medical
2. National Cancer Institute (2012). Surveillance, Epidemiology, and End Results. Retrieved from <http://seer.cancer.gov/statfacts/html/cervix.htm>
3. Waggoner, S. (2003). Cervical cancer. *The Lancet*, 361, 2217-222

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## 17.Pregnancy Of Unknown Location

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**Introduction:** When dealing with a pregnancy of unknown location, one must consider rarities such as ovarian ectopics and be mindful of differentiating it from corpus luteal cysts intraoperatively (1,2).

**Case:** Our patient is a 32 year old G6P5004 at 5 weeks gestational age by her last menstrual period who had presented to Monmouth Medical Center's emergency department complaining of 3 weeks of

intrauterine pregnancy was visualized. She underwent an exam under anesthesia, IUD

lower abdominal discomfort with vaginal bleeding. Her obstetrical and gynecological history included five spontaneous vaginal deliveries with placement of a copper intrauterine Device (IUD) 2 years prior. Surgical history was positive for a laparoscopic appendectomy. Physical exam demonstrated tenderness to palpation without guarding or rebound in the right lower quadrant. Pelvic exam noted a closed cervical OS with no evidence of adnexal masses. IUD strings could not be appreciated. A Quantitative BHCG of 7,720 with an hemoglobin and hematocrit count of 10.3/32.2 was appreciated. Pelvic ultrasound was positive for a complex lesion in the right ovary measuring 2.9 x1.8 cm, with complex debris in the pelvis. No removal, laparoscopy, partial oophorectomy, and removal of right ovarian mass with irrigation of

pelvis (3). Both tubes appeared intact and non-edematous. Pathology was consistent with products of conception.

Discussion: Sonogram findings, quantitative BHCG, progesterone levels and physical exam

Ref.

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2. Bouyer J, Coste J, Fernandez H, Pouly JL, Job-Spira N. Sites of ectopic pregnancy: a 10 year population-based study of 1800 cases. *Hum Reprod*. 2002 Dec;17(12):3224-30

may not be definitive, hence a high index of suspicion must prevail in the proper medical and surgical management of ectopic pregnancies (4,5) for optimal patient care and outcome.

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## 18. Nitrofurantoin Induced Pulmonary Injury During Pregnancy

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Case: A 16 yo G1P0 at 28.5 weeks pregnant with recent history of pyelonephritis treated with IV ceftriaxone and prophylactic nitrofurantoin, presented to the ED with symptoms of fever and right flank pain significant for recurrent pyelonephritis. Her temperature was 101.2 and normal blood pressure. Her initial exam was significant for right CVA tenderness and lungs were clear to auscultation. A few hours after admission, she complained of cough, fever, and shortness of breath with bilateral crackles noted on exam. Chest CT revealed extensive bilateral alveolar opacities without evidence of pulmonary or cardiovascular etiology (Figure1). An infectious work-up was negative, and preeclampsia was ruled out. Complete recovery occurred rapidly after discontinuation of nitrofurantoin.



Discussion: Nitrofurantoin is an antibiotic frequently used for the prophylaxis and treatment of UTIs in pregnancy. Side effects are generally mild, although rarely serious pulmonary injury may occur (1). Symptoms vary including fever, dyspnea, cough, and rash (2-3). Diagnosis is based on clinical presentation and exclusion of other diagnoses. Common laboratory findings include eosinophilia, leukocytosis, and elevated ESR (2-3). Abnormal radiographic findings with diffuse parenchymal changes may be seen in one-third of patients (3). Discontinuation of nitrofurantoin often resolves the symptoms within 24 to 72 hours. Oral glucocorticoids may be helpful, although even without glucocorticoids, resolution of severe pulmonary toxicity is usually achieved (4).

Ref.

1. Madani Y, Mann B. Nitrofurantoin-induced lung disease and prophylaxis of urinary tract infections. *Prim Care Respir J*. 2012; 21(3): 337-41
2. Holmberg L, Boman G. Pulmonary reactions to nitrofurantoin. 447 cases reported to the Swedish Adverse Drug Reaction Committee 1966-1976. *Eur J Respir Dis*. 1981; 62: 180.
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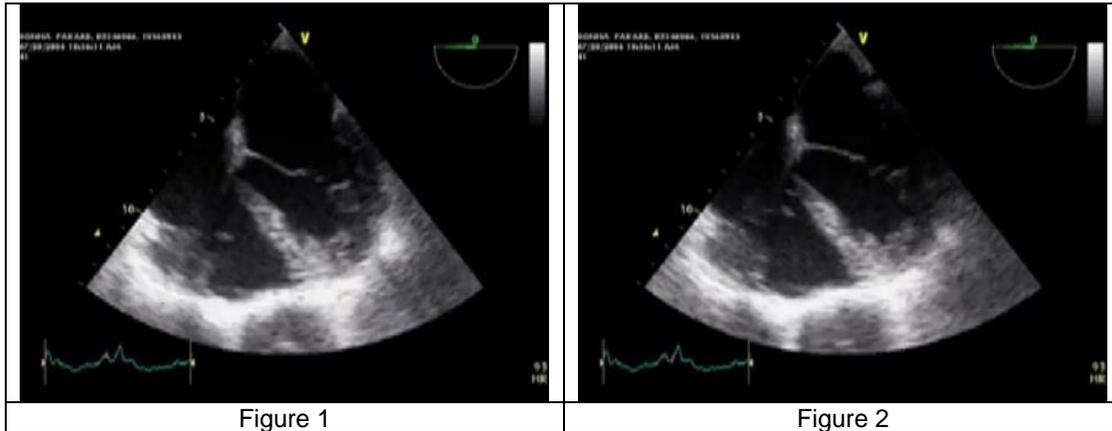
## 19. Rescue TEE Diagnosis of Acute Pulmonary Embolism Prompting Pulmonary Embolectomy

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\*\* Allegheny General Hospital: Department of Anesthesiology

Case: A 19 yo female presented for revision of a ventriculoperitoneal (VP) shunt that was placed after resection of a meningioma. After the VP shunt was placed without complications, shortly following extubation, the patient exhibited shortness of breath, cyanosis, and had oxygen saturation of 85%. The patient's trachea was re-intubated, but she developed bradycardia, then pulseless electrical activity. Cardiopulmonary resuscitation was initiated. A transesophageal echocardiography (TEE) revealed a dilated, hypokinetic right ventricle, severely under filled hyperdynamic left ventricle, and a dilated pulmonary artery (PA) with high suspicion for pulmonary embolus. An emergent median sternotomy was performed and cardiopulmonary bypass (CPB) was initiated. A large saddle embolus was removed from the PA after main pulmonary and right pulmonary arteriotomies were performed.



Discussion: PE is associated with significant perioperative morbidity and mortality,<sup>1</sup> especially if not diagnosed early and treated aggressively.<sup>2</sup> TEE imaging may reveal direct visualization of a PE and demonstrate secondary signs of PA obstruction, such as right ventricular dilation, pulmonary artery dilation, and tricuspid regurgitation.<sup>1,2</sup> Severe pulmonary artery obstruction if not relieved, will lead to cardiac arrest and death in up to 70% of patients within the first hour of presentation.<sup>2</sup> Although TEE permits direct visualization of the PE in some patients, the interposition of the trachea and left main stem bronchus may interfere with visualization.<sup>1</sup> TEE evidence of PA obstruction along with the clinical presentation may be sufficient to make the diagnosis.<sup>1</sup> Immediate availability of diagnostic techniques provided by anesthesiologists have improved the survival of patients with acute PE.<sup>2</sup>

Ref.

1. Rosenberger, P. et al. Utility of Intraoperative Transesophageal echocardiography for Diagnosis of Pulmonary Embolism. *Anesth Analg* 2004;99:12–6
2. Dauphine, C. et al. Pulmonary Embolectomy of Acute Massive Pulmonary Embolism. *The Annals of Thoracic Surgery* 2005;79:1240–4 and *Pain Medicine* 2007; 3:203-208

## 20. Automated breast volume scanning (ABVS): Case of invasive mammary ductal carcinoma found in a woman with dense breast tissue.

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 \*\*Drexel University College of Medicine: Department of Radiologic Sciences

Breast cancer is the second leading cause of cancer death in women with mammography being the only screening method shown to decrease mortality (1). Mammography alone, however, does not perform as well as mammography with supplemental screening (i.e. breast MRI with and without contrast or hand-held breast ultrasound (HHUS)) in intermediate to high-risk women such as those with a genetic predisposition or dense breasts. Supplemental screening is therefore recommended in these populations (2). Limitations with breast MRI include time of acquisition (>1 hour), expense (>\$1000), anxiety from claustrophobia and loud noise during the exam, availability, exposure to Gadolinium, inability to perform on patients with certain implanted devices/hardware (i.e. pacemakers), inability to detect tiny calcifications, and high false-positive rates. Limitations of HHUS screening include time

of acquisition (>1 hour), high false-positive rates, and operator-dependence. Automated breast volume scanning (ABVS) is a relatively new (available since 2009) potential alternative to HHUS screening that provides both multiplanar 3D/2D high resolution acquisitions of both breast in 10-15 minutes, requires short interpretation times (<5 minutes), is operator-independent, and costs around \$150 (3). There is, however, limited data on the utility of ABVS as a supplemental screening tool. The following case presents a biopsy proven invasive mammary ductal carcinoma found in a 40 year-old woman with dense breast tissue. Mammography showed a mass in the left breast which required supplemental imaging. Both MRI and ABVS images independently and clearly demonstrated a lesion with numerous suspicious characteristics that led the interpreter to recommend tissue sampling.

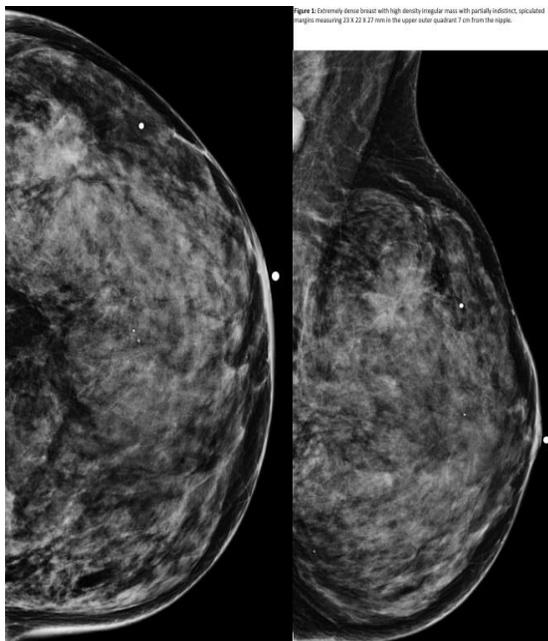


Figure 1 Dense breast with high density mass, partially indistinct, speculated margins 23x22x27mm in upper outer quadrant 7cm from nipple

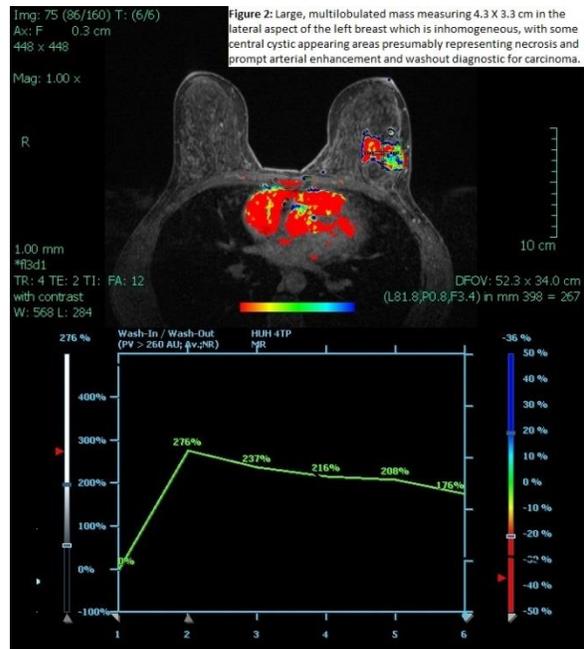


Figure 2

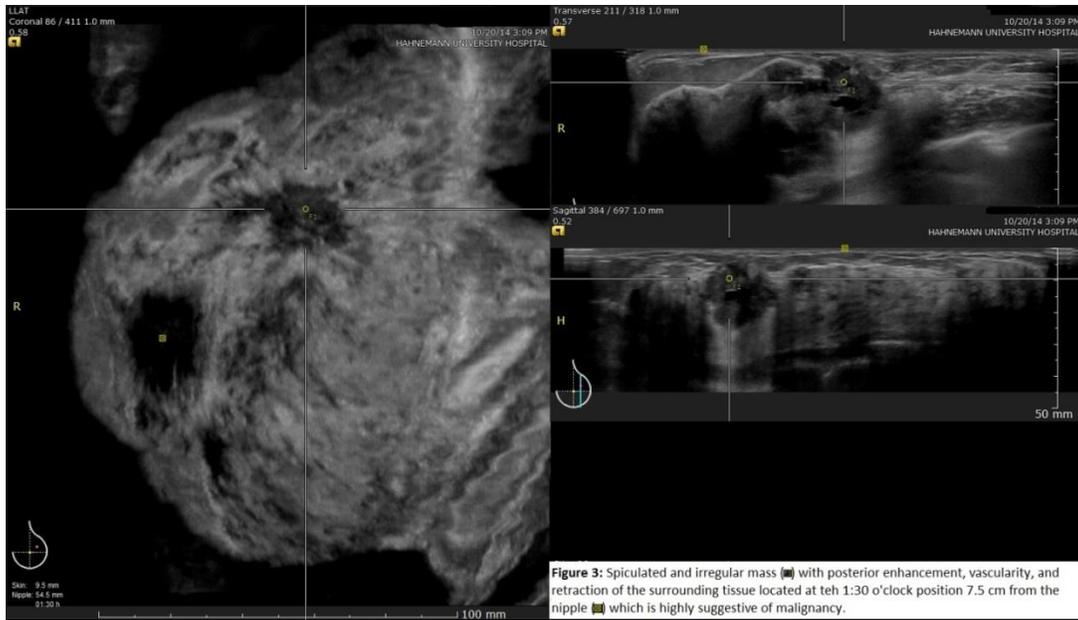


Figure 3

Ref.

1. Reduction in breast cancer mortality from organized service screening with mammography: 1. Further confirmation with extended data. *Cancer Epidemiol Biomarkers Prev.* 2006;15(1):45-51
2. ACR Appropriateness Criteria: Breast Cancer Screening [serial online] updated 2012. Available from: <https://acsearch.acr.org/list>

3. Porter B. and Seck H. Whitepaper Visualization of Mammographically Occult Breast Cancer. Automated Breast Volume Scanning. [serial online] July 2009. Available from: [http://usa.healthcare.siemens.com/mammography/whitepapers?sort-by=Date&number-per-page=15&CLINICAL\\_SPECIALITIES=WOMEN&CLINICAL\\_INDICATION=CI\\_BREAST%7](http://usa.healthcare.siemens.com/mammography/whitepapers?sort-by=Date&number-per-page=15&CLINICAL_SPECIALITIES=WOMEN&CLINICAL_INDICATION=CI_BREAST%7)

## 21. Contralateral Horner's Syndrome Following Stellate Ganglion Block under Fluoroscopy

**INTRODUCTION:** Stellate ganglion block is an established technique used to treat a variety of painful conditions including those neuropathically mediated. The stellate ganglion block is especially useful for diagnostic and treatment purposes in complex regional pain syndrome of the upper extremity (1). Following a stellate ganglion block, the development of ipsilateral Horner's syndrome is an indicative sign of a properly performed block (2).

**CASE:** A 25 year old female with a history of CRPS of her right upper extremity presented for a scheduled right stellate ganglion block under fluoroscopy. The patient had a history of short term successful relief with stellate ganglion blocks. Following spinal cord stimulator explant, the patient

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began experiencing an exacerbation of her symptomatology. The patient subsequently underwent a right sided stellate ganglion block under fluoroscopic guidance using a total of 15ml of 0.25% ropivacaine. Following the procedure, the patient developed Horner's syndrome on the contralateral side of her face with no relief of her symptoms.

**DISCUSSION:** An indication for a properly performed stellate ganglion is ipsilateral development of Horner's syndrome. Our patient had a history of appropriate responsiveness but in this instance developed contralateral Horner's syndrome. Literature review showed that a risk for contralateral spread was injectate

volumes greater than 10ml. However, these high volumes were associated with bilateral Horner's syndrome.<sup>3,4</sup> On medical record review, the patient had a tracheostomy performed since we performed her last stellate ganglion block. This may have led to the creation of anomalous fascial planes which resulted in contralateral spread.

Ref.

1. Molloy RE and Bonzon H. Neurolytic blocking agents: Uses and complication. In: Raj PP, ed. Practical Management of Pain, ed 4, Philadelphia

Mosby 2008;839-850

2. Malmqvist EL, Bengtsson M, Sorenensen J. Efficacy of stellate ganglion blocks: A clinical study with bupivacaine. Regional Anesthesia 1992; 17:340-347

3. Hogan Q, Erickson S, Haddox D et al. The spread of solution during stellate ganglion block. Regional Anesthesia 1992; 17:78-83

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## 22. Peripheral Nerve Blocks as the Primary Anesthetic in the Morbidly Obese

Introduction: Although peripheral nerve blocks are technically difficult to place in the morbidly obese, a successfully placed nerve block can limit the numerous complications associated with general anesthesia.

Case #1 is a 41 year old morbidly obese male (BMI 73.9kg/m<sup>2</sup>) presented for a left stump wound debridement. Under ultrasound guidance, he received a femoral nerve block (identified at 5cm) and tibial and

Figure 1 Femoral



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common peroneal nerve blocks (identified in the popliteal fossa at 4cm)

Case #2 is a 41 year old morbidly obese male (BMI 70kg/m<sup>2</sup>) presented for incision and drainage of right leg wound. Under ultrasound guidance, he received a femoral nerve block (identified at 5cm) and a sciatic nerve block (identified at 11cm). Both patients successfully received the block and surgery with no sedation

Figure 2 Sciatic



Discussion: Obese surgical patients often have difficult airways, may be at increased risk for aspiration, and frequently have OSA with increased sensitivity to opioids<sup>(1)</sup>. According to the ASA Practice Guideline, regional anesthesia should be the primary anesthetic choice for obese patients undergoing surgery<sup>(2)</sup>. There is very little data regarding peripheral nerve blocks in morbidly obese patient. However, there is evidence of improved success rates by using ultrasound to place peripheral nerve blocks in the obese patient<sup>(3,4)</sup>. Avoiding general anesthetic can increase patient satisfaction and recovery time while decreasing post-operative pain, sedation, and respiratory depression<sup>(2)</sup>.

Ref.

1. Casati A, Putzu M. Anesthesia in the obese patient: pharmacokinetic considerations. J. Clinical Anesth 2005; 17: 134-45

2. Stoeling's Anesthesia and Co-Existing Disease 2012; 6: 326-327
3. Chantzi C, Saranteas T, Zogogiannis J, et al. Ultrasound examination of the sciatic nerve at the anterior thigh in obese patients. *Acta Anaesthesiol Scand* 2007; 51: 132
4. Schwemmer U, Papenfuss T, Greim C, et al. Ultrasound-guided interscalene brachial plexus anaesthesia: difference in success between patients of normal and excessive weight. *Ultraschall Med* 2006; 27:245-250

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### 23.UNILATERAL APPROACH TO NEUROLYTIC SUPERIOR HYPOGASTRIC PLEXUS BLOCK FOR CHRONIC PELVIC PAIN ASSOCIATED WITH CANCER

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Introduction: Neurolytic superior hypogastric plexus blockade[SHPB] can effectively relieve cancer-associated chronic pelvic pain[1,2]. Medical literature often describes bilateral or transdiscal approaches to SHPB[1,2], however, there is limited focus on evaluating efficacy of a single, unilateral, non-discal approach.

Case Report: A 44-year old female with metastatic cervical cancer presented with intractable pelvic pain. Pain was throbbing, burning in quality. Her progressively increasing opiate regimen produced debilitating side effects including tremors and sedation. Following consultation, she consented to a fluoroscopically-guided diagnostic SHPB via the classic bilateral posterior approach. Given recent increased left-sided pain, the procedure began on the left with 10 milliliters 0.25% ropivacaine injected per standard protocol. She received immediate 50% reduction in overall pain with left-sided treatment only and refused continuation of the procedure secondary to increasing anxiety. Given her anxiety and significantly decreased pain, a unilateral approach was also pursued for the therapeutic SHPB. Injection of 8 milliliters 7% phenol again produced immediate and long-term results. No complications noted. For two months, the patient decreased opioid consumption and increased ambulation secondary to her excellent response.

Discussion: This case indicates a left-sided SHPB can provide significant relief for bilateral pelvic pain secondary to metastatic cervical cancer. Cross-communication between the superior hypogastric plexuses[3] or spread across the prevertebral

space midline likely contributed to the bilateral effect. Literature suggests the left superior hypogastric plexus contributes more to pelvic innervation[3,4]. When patient preference, time, or anatomy presents limitations to bilateral approaches, a left-sided SHPB can provide significant relief for bilateral pelvic pain.

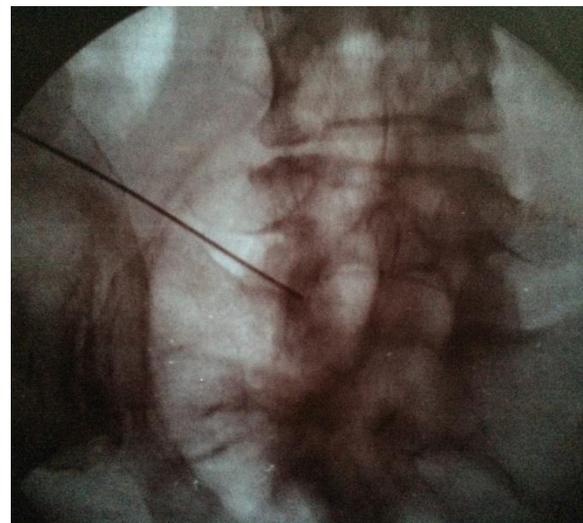


Figure 1 Left-sided superior hypogastric plexus blockade (AP view)

Ref.

1. Plancarte R, de Leo-Casasola OA, El-healy M, Allende S, Lema MJ. Neurolytic superior hypogastric plexus block for chronic pelvic pain associated with cancer. *Reg Anesth.* 1997;22[6]:562-568.
2. Waldman SD. Hypogastric plexus blockade. *Atlas of Interventional Pain Management*, fourth edition. 2015; chapters 112- 115.
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between bilateral pelvic plexuses. J Urology. 1999;161[1]:320-325  
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innervation of the colon. The Anatomical Record. 1956;124[1]:67-76

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## 24. Airway Management and the Role of Video Laryngoscopy in the Adult Epiglottitis Patient

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Introduction: Epiglottitis is a serious condition in the adult population (1,2,3). Here, we present a case study discussing the use of video laryngoscopy in treatment and management.

Case: A 43 year old woman presented with acute respiratory distress. She had a temperature of 103 Fahrenheit, excessive salivation, was sitting in the tripod position, and was taken to the OR immediately for airway management. Surgery was present if surgical airway became necessary, and general anesthesia induced using propofol. She was easy to mask ventilate, rocuronium given, and video laryngoscopy attempted. The patient was successfully intubated on the second attempt with a 6.5 ETT, each time using a pediatric fiberoptic scope to evaluate placement. During the entire process, the patient maintained a SaO<sub>2</sub> of 99%. A picture was taken of the supraglottic tissue seconds after intubation using video laryngoscopy showing severe edema. Each day following

intubation, the patient's supraglottic tissue was examined by video laryngoscopy, and the images compared. On the third day, the edema decreased by 50%, and the patient was extubated with no complications.

Conclusion: Here, we demonstrate the usefulness of video laryngoscopy to guide management as a comparative tool in monitoring edema, and determining an appropriate time to extubate in the epiglottitis patient. By comparative analysis, we extubated quickly and reduced the risk for complications secondary to prolonged intubation, which are common (4). We propose video laryngoscopy is an objective way to diagnose, intubate, and follow the course of treatment by comparing daily edema in epiglottitis



Figure 1



Figure 2

Ref.

1. Ng HL, Sin LM, Li MF, Que TL, Anandaciva S. Acute epiglottitis in adults: a retrospective review of 106 patients in Hong Kong. *Emerg Med J.* 2008;25:253-5
2. Glynn F, Fenton JE. Diagnosis and management of supraglottitis (epiglottitis). *Curr Infect Dis Rep.* 2008;10:200-4

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## ARTICLES

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### 1. Cardiac Arrest in a Healthy Twenty-Five-Year-Old Female Following Induction of General Anesthesia for Elective Tonsillectomy

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Case: A twenty-five-year old Caucasian female with past medical history of only recurrent tonsillitis presented for elective tonsillectomy. Patient was 5'2", 63 kg, with a Mallampati grade 1 airway. Social history was positive for rare alcohol use and surgical history included only wisdom teeth extraction. The patient had no known drug allergies, no pertinent family history, and no issues with anesthesia in her or her family. Given the patient's good health and the low-risk nature of the procedure, neither pre-operative laboratory data nor electrocardiogram were ordered. Immediately prior to entering the operating room, the patient was given 2mg of versed. ASA standard monitors were placed upon entry and the patient was pre-oxygenated with 100% FiO<sub>2</sub> for approximately 3-5 minutes. Immediate pre-induction vital signs were as follows: blood pressure 140 mmHg/93 mmHg, heart rate 79 bpm and peripheral capillary oxygen saturation of 100%. General anesthesia was induced with fentanyl 100mcg, lidocaine 50 mg, propofol 150 mg, and succinylcholine 120 mg. The patient was also given dexamethasone 4 mg at the request of the surgeon. After induction, the patient was easily bag masked and ventilated for approximately 3 minutes. A C-MAC 3 video laryngoscope was used for intubation for the purposes of new resident education. During intubation, the visual on the C-MAC screen disappeared and reappeared several times, which

caused a slight prolongation of time during laryngoscopy and endotracheal intubation. Immediately after intubation, tube placement was confirmed with chest rise, fogging of the tube, equal breath sounds bilaterally and positive end-tidal CO<sub>2</sub> (EtCO<sub>2</sub>). Mere seconds later, the EtCO<sub>2</sub> began to rapidly decrease followed immediately by the loss of both plethysmography and electrocardiogram waveforms. There was no palpable radial or carotid pulse and cardiopulmonary resuscitation was promptly initiated. A dilute epinephrine stick was immediately available and the patient was given 0.2mg of epinephrine, as well as atropine 1mg. After approximately 35-40 seconds, the patient had return of spontaneous circulation. Shortly thereafter, a left radial arterial line was placed. ABG obtained during arrest revealed a mild respiratory acidosis with a paO<sub>2</sub> of 109. EKG immediate post-arrest showed some inferolateral T wave inversion consistent with a recent arrest and cardiopulmonary resuscitation. ABG after return to spontaneous circulation was 7.45 with a paO<sub>2</sub> of 491 and a potassium of 3.1. Surgical case was aborted and postponed to a future date. She emerged from anesthesia without issue and was successfully extubated in the OR and transported to the Medical Intensive Care Unit with supplemental oxygen at ten liters-per-minute via facemask. The patient was awake and pleasantly

conversant without any deficits. Vital signs were stable on arrival to the MICU and post-arrest transthoracic echocardiogram, ekg and stress test were all normal without any notable findings.

Discussion: When we examine potential etiologies, we must always exclude anaphylaxis as a cause of intraoperative cardiac arrest. Anaphylaxis is, however, less likely in this case given the short time between receiving induction medications and experiencing symptoms of cardiac arrest. Although cutaneous manifestations are not necessary for a diagnosis of anaphylaxis, it is important to note their absence in this case. There was no evidence of erythema, piloerection, bronchospasm or change in airway pressures on mechanical ventilation. Typically, there is a much slower return of spontaneous circulation in the setting of anaphylaxis and larger doses of inotropic and anticholinergic drugs are usually required. Unfortunately, a tryptase level was not measured postoperatively to officially rule out this diagnosis. Still, this clinical presentation does not favor anaphylaxis. Another potential etiology to be excluded is hyperkalemia. Classically, hyperkalemic cardiac arrest during induction of general anesthesia with succinylcholine occurs in patients with specific underlying pathology like burns, trauma, immobilization injury or neuromuscular disease. As aforementioned, this patient had no such medical history. Furthermore, an ABG performed immediately post-arrest showed a potassium level of 3.1 mEq/L after 120 mg of succinylcholine which indicates that the patient was eukalemic or, likely, hypokalemic prior to induction. Although the patient is 25 years old, we also consider that the patient could have strong vagal reflexes as seen in children. It has been well documented that succinylcholine, which mimics acetylcholine, can cause profound bradycardia in children given their high sympathetic tone. Given her adult age and the extremely short duration of surgery, the use of succinylcholine was believed to be appropriate. Anticholinergic pretreatment with atropine or glycopyrolate was considered but dismissed since her heart rate was 100 bpm upon entry into the OR and 79 bpm immediately prior to induction. The possibility remains that the patient could have an immature sympathetic nervous with predominant vagal tendencies which, when given the induction dose of succinylcholine, caused

severe bradycardia leading to asystole. A more likely cause of her asystole is the combination of vagotonic medications she received on induction. Fentanyl reduces sympathetic response by decreasing a patient's reaction to pain. Succinylcholine mimics acetylcholine and stimulates parasympathetic nerves by directly acting on muscarinic receptors in the sinoatrial node, leading to bradycardia. Propofol also causes vasodilation and a decrease in systemic vascular resistance and blood pressure. Additionally, propofol is hypothesized to cause bradycardia by directly inhibiting the SA node. A decrease in SVR may also precipitate paradoxical bradycardia via the Bezold-Jarisch reflex, which involves an initial compensatory increase in heart rate followed by an abrupt decrease in both heart rate and blood pressure. This is triggered by pressure receptors in the under-filled and under-perfused left ventricle via cranial nerves IX and X in an effort to increase filling time. Finally, the patient's asystolic event could also be the result of increased vagal stimulation. Although laryngoscopy normally causes a sympathetic response due to catecholamine release secondary to pain, it is possible that our prolonged intubation due to the faulty C-MAC laryngoscope may have caused a bradycardic response. With the prolonged intubation, there is possible stimulation of cranial nerves IX and X. Agitation of the undersurface of the epiglottis during direct and video laryngoscopy has the potential to stimulate the internal branch of the superior laryngeal nerve, a branch of the vagus nerve. Vagal nerve stimulation is known to potentially cause bradycardia and asystole. It is also thought that laryngoscopy can trigger an arrest of the sinoatrial node via afferent fibers from cranial nerve IX and X, as well as vagal efferent processes. After examining the potential etiologies and performing reviews of literature, there is very little information describing asystole after this same combination of induction medications and no available case report of this occurring in a healthy adult. We believe it was not one single factor that resulted in our healthy patient's arrest but rather a combination of factors culminating in such profound bradycardia. Most likely, cardiac arrest was precipitated by a combination of vagotonic medications such as fentanyl, succinylcholine and propofol with the concomitant direct vagal stimulation of prolonged

laryngoscopy in a patient possibly prone to vagal responses. This case is of particular importance in that it illustrates that even healthy, robust patients can experience drastic adverse side effects of the medications anesthesiologists use daily. Vigilance in the setting of these potential adverse reactions is paramount. In retrospect, a smaller dose of succinylcholine based on 1 mg/kg as opposed to 2mg/kg for induction may have been more appropriate for this young patient.

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## 2. Post-traumatic Stress Disorder Among Physicians Related to Job Encounters in Different Specialties Through All Stages of the Medical Profession

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**Abstract:** Post-traumatic stress disorder (PTSD) is a syndrome that may occur in people who have been exposed to a stressful event. Classically it has been studied in relation to war or less commonly with respect to physicians exposed to mass casualty situations. There is a paucity of data evaluating PTSD among physicians outside of these conditions. **Objective:** To estimate prevalence of PTSD among physicians related to job encounters. **Methods:** A self-administrated questionnaire including PTSD Checklist-Civilian Version (PCL-C) and various demographic data was emailed to physicians among various departments at a local community medical center. **Results:** Fifty-eight of 628 (9.2%) physicians surveyed completed the questionnaire. Some type of traumatic event was witnessed or experienced by 47 (81.0%) of the 58 respondents. Based on total severity score exceeding a normative threshold using a cut off of 30, 8/47 (17.0%) had PTSD symptoms, 1/8 (12.5%) met DSM IV-TR criteria for PTSD. These individuals were from 5 different departments (anesthesia, dentistry, emergency medicine, pathology and pediatrics). **Conclusion:** PTSD is more common among health care professionals than the general population. It appears to affect all physician specialties, including those that some would consider "low risk"

**Keywords:** Post-traumatic stress disorder (PTSD); PTSD Checklist-Civilian Version; health care professional

**Introduction:** Post-traumatic stress disorder (PTSD) is a syndrome that may occur in people who have been exposed to a stressful event. Symptoms include reliving the event, avoidance behavior, and increased arousal. The criteria for PTSD were expanded in the Diagnostic and Statistical Manual of Mental Disorders IV-Text Revision (DSM IV-TR) to include witnessing the death or near death of another person as an inciting event for PTSD<sup>1</sup>. PTSD may begin immediately or be delayed by several months after the inciting event<sup>(1)</sup>. The lifetime prevalence of PTSD is estimated at 8% in

the general population<sup>(2)</sup>, but research on PTSD among physicians is limited. Much of the research in this area has examined PTSD rates in physicians exposed to the atrocities of war (11%–18%)<sup>(3-6)</sup>. However far fewer studies have examined this topic in areas unrelated to a mass-casualty setting. In our study we sought to evaluate the prevalence of PTSD among medical professionals related to job encounters in different specialties through all stages of medical education and practice.

**Table 1. Total Surveyed and Return Rate**

DEPARTMENT	TOTAL # SURVEYED (# of RESIDENTS)	# RETURNED (%)
Anesthesia	17 (0)	6 (35.3%)
Dentistry	110 (50)	5 (4.5%)
Emergency Medicine	15 (0)	8 (53.3%)
Internal Medicine	239 (39)	4 (1.7%)
OB/Gyn	58 (10)	1 (1.7%)
Orthopedics	41 (10)	2 (4.9%)
Pathology	18 (13)	1 (5.6%)
Pediatrics	101 (18)	24 (23.8%)
Psychiatry	12 (0)	2 (16.7%)
Radiology	17 (9)	2 (11.8%)

Methods: Department chairmen were asked whether they would survey their residents and faculty on the subject of PTSD. Participating departments then invited the participants via email and provided a link to the web-based survey. The physicians were informed of the purpose of the study and that all information was anonymous and contained no identifying information. Furthermore they were provided with contact numbers within the psychiatry department if they felt they needed assistance with any issues they were facing. The email request to participate in the survey was sent in May and June of 2012, 4 weeks apart. The end of the academic year was chosen to maximize the resident's exposure to potentially stressful patient care situations. The survey included a self-administrated questionnaire including the PTSD Checklist-Civilian Version (PCL-C), demographic questions (age group, gender, department), as well as additional questions (describe the stressful situation, how long ago it took place, whether the answers reflect current or past feelings, seeking medical advice, and whether medical advice was easily available or not). The questionnaire contained brief instructions specified in the PCL literature. PCL-C is a validated scale for PTSD screening, comprising 17 items that correspond to the key symptoms of PTSD. Each item is rated using a (1-5) scale indicating how much they have been bothered by that symptom. Responses range from 1 (not at all) to 5 (extremely). All items are added for total severity score (17-85). The PCL was scored to provide a presumptive diagnosis in three ways: 1. Determine whether an individual meets DSM-IV-TR symptom criteria as defined by at least 1 B item (questions 1-5), 3 C items (questions 6-12), and at least 2 D items (questions 13-17) Symptoms rated as "Moderately" or above (responses 3 through 5 on individual items) are

counted as present. 2. Determine whether the total severity score exceeds a validated normative threshold. Given the community based setting of this hospital and the surrounding area we used a cut-off score of 30 as possible PTSD, as previously described in a prior study(7). 3. Combine methods 1 and 2 to ensure that an individual meets both the symptom pattern and severity threshold(8). Criterion A of the DSM-IV-TR was not applied in our study as most of the answers to describe the traumatic event wasn't detailed enough to include responses like fear or helplessness. This didn't affect the validity of our tool as PCL-C was selected for its ability to screen for PTSD without asking about the specific traumatic events that may have caused the PTSD. The study received Institutional Review Board (IRB) approval.

Results: Ten of the 11 department chairs agreed to participate in the study. The Department of Surgery declined participation. Fifty-eight of the 628 (9.2%) physicians who were available to be surveyed completed the questionnaire, 3 did not identify their department (Table 1). Among the responders there were 35/58 (60.3%) males, 21/58 (36.2%) females, and 2 (3.5%) provided no answer for gender. The responders were of various ages with 16 being in (40-49) age group (27.6%), 13 being in (30-39) age group (22.4%) (Table 2). Some type of traumatic event was witnessed or experienced by 47 (81.0%), 26 males (55.3%), 19 females (40.4%), and 2 (4.3%) didn't specify their gender (Table 3). The average PCL severity score was 23.4 (range 17-60) for all responders, 24.9 (range 17-60) for those who reported traumatic events, and 39.0 (range 31-60) for the eight responders with a

PCL greater than 30. Based on total severity score exceeding a normative threshold using a cut off of 30; 8 (13.8% of total responders and 17.0% of those who reported traumatic events) had PTSD symptoms. Of these 8 physicians there were 6 (75%) males and 2 (25%) females. One responder (1.7% of total responders, 2.1% of those reporting stressful events, and 12.5% of the 8 with high scores on the PCL) met DSM 4 -IV-TR criteria for PTSD. This individual scored a 60 on the PCL and did seek psychological help, which they stated was readily available. Given the small numbers we could not demonstrate a significant difference among different age groups however 3/8 (37.5%) of those meeting DSM IV criteria were from the 50-59 years age group. Regarding the timing of the event in relation to the time of the survey; 5 reported the event occurred greater than 1 year prior; while 2 reported the incident was less than 6 months prior to the survey.

Table 2. Demographic Data

GENDER	N (%)
Male	35 (60.3%)
Female	21 (36.2%)
No Answer	2 (3.5%)
AGE GROUP	
21-29	11 (19.0%)
30-39	13 (22.4%)
40-49	16 (27.6%)
50-59	11 (19.0%)
60 or older	5 (8.6%)
No Answer	2 (3.4%)

Other examples could be classified as “physician error”: “Needle stick from an HIV positive patient”, “Child had CVA with hemiparesis due to a procedure”, “Unable to ventilate, unable to intubate elective surgical patient”, and “Wrong medication injection during labor leading to fetal bradycardia. Baby delivered by C section.

Discussion: Medical personnel routinely deal with death, dying and other stressful situations in their patient encounters. One would suspect that these daily experiences within the life of a healthcare professional can be difficult to manage psychologically, and have the potential to cause pathologic sequelae such as PTSD. While there have been some studies investigating the incidence of PTSD among physicians in mass casualty situations such as war, there is a paucity of data evaluating PTSD in routine practice. Our study, conducted at a community medical center, appears to be the first to evaluate physicians in multiple specialties and stages of their career.

One physician did not report the timing of the event. Examples of events that were provided as “free text” within the survey include events relating to a “patient death”: “As resident working in the ER and losing pregnant women after a car accident”, “Patient dying in an elevator on the way to the operating room”, “ED code with kid dying due to TV falling on head”, and “Rupture brain aneurysm and subsequent death in a healthy postpartum patient collapsed in front of me, I had spoken to her and placed an epidural earlier in her earlier in the day.”

Herein we found a relatively high number with 13.8% of the total responders having some evidence of PTSD. This is higher than the general population rate of 8% observed elsewhere<sup>2</sup>. However 8% is the estimated lifetime prevalence rate, while the PCL-C is thought to measure point prevalence<sup>(9)</sup>. We did not demonstrate any prevalence in PTSD based on gender. There is a suggestion that older physicians, those with greater presumed exposure to job related stressful events, were more likely to score high on the PCL. It is interesting to note that among the specialties in which responders scored high on the PCL, three would be considered “high risk” for stressful events (anesthesia, emergency medicine, and pediatrics). Surprisingly responders from what one would consider “lower risk” specialties of dentistry and pathology also scored high on the PCL. The etiology of the stress was typically related to patient death or physician error. Our study did not demonstrate any predilection of a given gender to either reporting a stressful event or meeting some criteria of PTSD.

A study from 2004 at Louisiana State University Health Sciences Center(10) which evaluated the presence of symptoms of PTSD among 59 Emergency Medicine residents came to similar conclusions. Seven (11.9%) residents reported sufficient symptoms to meet the DSM IV-TR written criteria for PTSD. Eighteen (30%) of the residents reported one or more symptoms in each of the 3 symptom categories, re-experiencing, avoidance, and arousal. Sixteen (27%) residents denied all symptoms. Each of the three symptom categories showed a statistically significant increase in the proportion of positive responses as the resident time in training increased ( $p < 0.01$ ). This study however did not include a validated screening tool for PTSD. It was also conducted at a single residency population, which may reflect a unique population.

A second study done 2004 in Canada (7) attempted to estimate the prevalence of PTSD in physicians in a regular practice in a medically underserved region. The survey included the PCL-C checklist where a PCL-C score of greater than 50 was used to define 'probable' PTSD and greater than 30 defined 'possible' PTSD. Among the 158 responders, 36.7% had possible PTSD, while 4.4% had "probable PTSD." No differences between demographic groups were observed for probable PTSD, but possible PTSD was more frequent in males than females (47.3% versus 20.4%). Mean scores were also higher for males than for females (30.4 versus 25.4).

A third study examined PTSD among 212 medical residents(11). They found, similar to our study, 13% of the residents had PTSD based on the scoring of a standardized questionnaire, including 20% of the women and 9% of the men. They found PTSD to be more frequent among residents that were single or divorced. Furthermore they found a correlation between PTSD symptoms and anxiety and depression. It is interesting to note that some responders in our study were unwilling to provide

requested demographic information. We assume this is due to concerns about anonymity, despite the assurances provided in the survey. This can be interpreted to reflect the ongoing "stigma" attached to psychiatric illness, even among health care professionals.

Our study had some clear limitations. As with all mailed questionnaires, there were problems with non-response. The response rate of 9.2% may not be reflective of the entire population surveyed. Indeed one could hypothesize that either those with significant stressful events were more inclined to answer the survey or those who feared stigmatization were less likely to complete the survey. The PCL-C has not been validated specifically in the physician population against the gold standard for diagnosing PTSD, a structured clinical interview such as the Clinician-Administered PTSD Scale (CAPS). However, it has been validated against standardized interviews for the diagnosis of PTSD in people experiencing motor vehicle accidents, sexual assault, cancer and war. The screening instrument has also been validated in populations without a defined exposure to a traumatic situation, including samples of female and male military veterans and a representative sample of the general female population. In these studies the sensitivity of the checklist has ranged from 0.6 to 0.99(12-14). As such the PCL has been used extensively in the literature as a screening tool for PTSD. The results of our study and those previously reported in the literature suggest that PTSD is more common among health care professionals than the general population. It appears to affect all physician specialties, including those that some would consider "low risk". Awareness of this problem should lead to greater focus on addressing these events with physicians as well as ensuring access to psychiatric services if needed. It would also likely be helpful to incorporate this issue into medical school and resident education.

Table 3. Departmental distribution of physicians with traumatic events

DEPARTMENT	MALE	FEMALE	PCL > 30	DSM IV CRITERIA	HELP
Anesthesia	3	3	1	1	1
Dentistry	1		1		
Emergency Medicine	5	1	3		
Internal Medicine	2				
OB/Gyn	—	—			
Orthopedics	2				
Pathology	0	1	1		
Pediatrics	9	13	2		
Psychiatry	1	1			
Radiology	1				
Rather Not Answer	2				

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### 3. Testosterone Use: Warnings and Pitfalls

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**Abstract:** The decision to evaluate a patient's testosterone levels should originate from a patient complaint, symptoms, and history or physical exam features that might suggest hypogonadism. Routine screening of patients without such signs or symptoms is not recommended; and if screening is done, levels must be interpreted correctly. Patients should be warned about potential adverse effects such as increasing prostate-specific antigen (PSA) and the risk of prostate disease, elevated hematocrit, and worsening of obstructive sleep apnea. Physicians must be aware of these risks to appropriately counsel patients before administering treatment. We describe a case of a patient who was asymptomatic with an incomplete evaluation for hypogonadism, who started on treatment and developed multiple adverse effects. We then review and summarize the literature regarding appropriate screening for hypogonadism, potential risks of treatment, and the need for monitoring.

**Keywords:** hypogonadism, testosterone therapy

**Case Presentation:** A 68-year-old male with a past medical history of benign prostatic hyperplasia (BPH), obstructive sleep apnea, aortic valve replacement secondary to severe aortic stenosis, and atrial fibrillation presented to the endocrine clinic for complaints of reduced libido and erectile dysfunction. Two years prior to this presentation, the patient had been well, and during a routine checkup lab testing was ordered showing decreased levels of free testosterone, 5.4 pg per milliliter (reference range 6.6-18.1 pg per milliliter) along with a total serum testosterone of 291 ng per deciliter (reference range 193-740 ng per deciliter). The patient did not complain of decreased libido or erectile dysfunction at the time of this visit. It did not appear that he had further laboratory testing or imaging done to evaluate possible causes for hypogonadism. He was subsequently started on testosterone replacement. Over the course of two years, the patient was on transdermal testosterone (5 grams) applied daily. Testosterone therapy was halted approximately eight weeks prior to his endocrinology visit due to elevated hemoglobin, with levels measuring above 18 grams per deciliter. The patient was referred to a hematologist, and phlebotomy was initiated for management of erythrocytosis. The patient's obstructive sleep apnea had also worsened over the past year, and he was referred to a pulmonologist for a sleep study and management of continuous positive airway pressure (CPAP) machine settings. Since discontinuing the testosterone, the patient did start to complain of erectile dysfunction and decreased libido, and wished to resume testosterone treatment. His current medications at the time of presentation to the endocrine clinic included: tamsulosin, solifenacin, sotalol, potassium chloride, omeprazole, tiotropium bromide inhaler, budesonide/formoterol inhaler, and vitamin c and zinc tablets. On physical exam patient was

normotensive with a resting blood pressure of 112/60 mmHg and a body-mass index (BMI) of 33.2. The remainder of physical exam was unremarkable.

**Screening for Hypogonadism:** The decision to evaluate a patient's testosterone levels traditionally originates from a complaint or symptom that might suggest hypogonadism. Current guidelines recommend against standard screening for androgen deficiency in the general population. In the case of our patient, testosterone levels were routinely measured, yet the patient had no complaints of decreased libido or sexual dysfunction at the time.(1) Even if the thought was to prevent symptoms with prophylactic treatment, studies have shown that hypogonadism as a sole cause of erectile dysfunction is rare.(2) If the decision is made to screen a patient, physicians should be aware of how to interpret the results and how several factors may interfere with accurate screening . A total testosterone level reflects both protein-bound and unbound testosterone, and the measurement can be affected if the concentration of sex hormone-binding globulin (SHBG) is altered. SHBG is commonly decreased in obesity and with the use of glucocorticoids; whereas aging and cirrhosis are causes of a decreased SHBG level. A serum free serum testosterone, when done by a reliable assay, or the calculation of the total testosterone with use of the SHBG and albumin concentrations, can be performed to obtain more accurate levels, see Table 1 (3-4). Testosterone levels have a diurnal variation and fluctuate during the day; therefore it is recommended to measure levels in the morning, at approximately 8 am.(4) If a low or low-normal level is obtained in screening, the value should be repeated, as 30 % of patients with a low normal testosterone level on initial testing have normal levels on repeated testing.(5)

An acute or subacute medical illness can also lower testosterone levels, and screening for hypogonadism during illness is not recommended.(6) Multiple studies have concluded that both total and free testosterone levels decrease with advancing age.(7),(8) Though the rate of decline can be based on individuality and presence of chronic disease, a specific link between hypogonadism and increased age, in an otherwise healthy male patient, has not been identified. Similar to younger males, it is not recommended to screen asymptomatic elderly patients for testosterone deficiency.(1)

Underlying Causes of Hypogonadism and Evaluation: After appropriate screening, the next step in the diagnostic process is to evaluate the patient for possible causes of hypogonadism.

Primary and secondary hypogonadism should be distinguished with measurement of serum follicle-stimulating hormone and luteinizing hormone.(9) Elevated gonadotropin levels suggest primary hypogonadism; the differential diagnosis includes congenital abnormalities (e.g. Klinefelter's syndrome) and acquired conditions, such as infection, testicular trauma, chronic systemic disease, medication use (e.g. chronic glucocorticoids). Low or normal gonadotropin levels suggest secondary causes. Further workup includes measurement of serum prolactin levels, thyroid hormone levels, screening for hemochromatosis, possible pituitary imaging, and evaluation for genetic disorders associated with low gonadotropin levels. Age of onset of hypogonadism, historical features, and physical exam findings guide further testing.

**Table 1**  
Conditions Associated with Alterations in SHBG Concentration<sup>4</sup>

Decreased SHBG Concentrations	Increased SHBG Concentrations
Moderate Obesity, Type 2 Diabetes Mellitus	Aging
Nephrotic Syndrome	Hepatic Cirrhosis and Hepatitis
Glucocorticoids, Androgens, and Progestins	Estrogens
Hypothyroidism	Hyperthyroidism
Acromegaly	Anticonvulsants
Familial SHBG Deficiency	HIV Disease

**Table 2**  
Monitoring Men Receiving Testosterone Therapy<sup>17</sup>

<b>Free and Total Testosterone Level</b>	3 to 6 months after initiation of therapy
<b>Hematocrit</b>	Baseline; 3 to 6 months after initiation of therapy; then annually
<b>Bone Mineral Density of Lumbar Spine and/or Femoral Neck</b>	1 to 2 years after initiation of therapy
<b>PSA</b>	*Baseline with digital rectal exam; 3 to 6 months after initiation of therapy
<b>Clinical Evaluation</b>	3 to 6 months after initiation of therapy; then annually to assess symptoms and possible adverse effects

\*In men 40 years of age or older with baseline PSA greater than 0.6 ng per deciliter

The Decision to Treat: Management of hypogonadism with testosterone replacement therapy is not a benign process. There are many factors to take into account before considering medical management. Treatment is normally recommended for symptomatic patients to improve sexual function (10-11). Incidental findings of low

testosterone levels, as was the case with this patient, do not necessarily warrant pharmacological therapy. Older patients should be evaluated on an individual basis to determine whether medical therapy is appropriate. The use of testosterone supplementation to treat symptomatic men over the age of sixty with borderline low

testosterone levels did not have any effect on sexual function(12). A meta-analysis of randomized controlled studies released in 2005 concluded the most likely adverse effects associated with testosterone replacement in older men were higher risks of detecting prostate events and developing elevated hematocrit levels(13). Our patient was over the age of sixty-five and asymptomatic at time of initial diagnosis. Guidelines suggest that therapy only be considered with the presence of both low testosterone levels on more than one occasion and significant symptoms of androgen deficiency (14).

Risks of Treatment and Monitoring: Once treatment has been initiated there are several laboratory values and symptoms to monitor (table 2).(15) Testosterone levels need to be measured three to six months after therapy has started (16). Mid-normal range of serum testosterone levels is the ultimate goal of therapy. A recommended goal for elderly patients is a testosterone level in the lower part of the normal range for young men (400-500 ng/dL)(17). All of the risks and benefits of testosterone should be explained in full to patients before initiating therapy. Androgens increase the production of erythropoietin and stimulate bone marrow stem cells. The hematocrit should be measured at baseline, again at three to six months, and then annually (17). If levels are greater than 54%, therapy should be held and patients should be evaluated for hypoxia and sleep apnea. Though there is no direct evidence suggesting that exogenous testosterone replacement causes or increases risk of prostate cancer, it may accelerate the detection of subclinical prostate cancer (15). In men over the age of forty, with a baseline prostate-specific antigen greater than 0.6 ng per deciliter, it is recommended to check a baseline digital rectal exam and serum prostate-specific antigen level before the initiation of treatment. Follow-up tests are also suggested three and six months after the start of replacement therapy, see Table 2 (17). If, however, there is a palpable nodule or induration on the prostate, or a prostate-specific antigen level of 4 ng per deciliter or greater, then testosterone treatment is not recommended (17). Recently, multiple studies have been published relating testosterone replacement with risks of developing or worsening cardiovascular disease. Unfortunately, two large studies released over the past year revealed conflicting results. A 2013 Veterans Affairs study suggested elderly patients with a history of undergoing coronary angiography were at increased risk of developing adverse outcomes when receiving testosterone therapy (18). These adverse outcomes included myocardial infarction, cerebrovascular event, and death. A study released in July 2014 concluded that older males treated with intramuscular testosterone did

not have increased risk of myocardial infarction.(19) Replacement therapy has shown to have either no or slightly positive effects on lipid profiles.(20) Our patient did have lipid profiles monitored while on testosterone treatment and showed no significant changes, either adversely or beneficially. Testosterone therapy may suppress spermatogenesis and is not appropriate for patients who desire fertility (21). Counseling regarding the inability to conceive children should always be performed when discussing the topic of testosterone replacement with a patient.

Returning to our case, underlying causes of hypogonadism were evaluated. The patient had been off all exogenous testosterone for 8 weeks. The patient was found to have normal range levels of thyroid-stimulating hormone, prolactin, follicle-stimulating hormone, and luteinizing hormone. Repeated testosterone levels showed a total serum testosterone of 257 ng per deciliter (reference range 250-1100 ng per deciliter) and free testosterone of 55.8 pg per milliliter (reference range 35.0-155.0 pg per milliliter). This specific set of blood work was the only set drawn at a different lab, accounting for the variability in reference ranges. After having repeated laboratory evaluation, the patient stated that his symptoms were improving, and the decision was made to monitor clinically, and observe if endogenous testosterone levels would rise off of the exogenous treatment. Five weeks later, repeat laboratory values showed total testosterone of 375 ng per deciliter (reference range 280-800 ng per deciliter), and free testosterone of 9.3 pg per milliliter (reference range 6.6-18.1 pg per milliliter). Three months later, the patient started to complain of worsening erectile dysfunction and low libido. His total testosterone levels now measured 270 ng per deciliter (reference range 250-1100 ng per deciliter) and free testosterone 33.5 pg per milliliter (reference range 35-155.0 pg per milliliter). Luteinizing hormone and follicle-stimulating hormone levels were 4.4 mIU per milliliter (reference range: 1.7-8.6 mIU per milliliter) and 6.3 mIU per milliliter (reference range 1.5-2.4 mIU per milliliter) respectively. Focused computed tomography of the head was performed revealing no mass or lesion involving the pituitary gland (magnetic resonance imaging of the brain could not be completed due to a history of a permanent pacemaker for treatment of atrial fibrillation). With most secondary causes eliminated, idiopathic hypogonadotropic hypogonadism was diagnosed. Analysis of the patient's bone mineral density revealed osteopenia of the right femoral neck and normal bone density of the lumbar spine and distal radius. His hematocrit remained stable and he was using his CPAP device consistently with much

better control of his obstructive sleep apnea. Low dose testosterone therapy was cautiously restarted using 5mg transdermal testosterone patches; with close observation of the patient's complete blood count and obstructive sleep apnea symptoms. Approximately one year after therapy was re-initiated, his PSA rose to 5.9 ng per deciliter. The previous peak level of PSA was 2.5 ng per deciliter. At this point, all testosterone therapy was discontinued. He was referred back to his urologist for evaluation of the elevated PSA level. Our patient experienced elevations in both hematocrit and PSA levels during testosterone replacement therapy. He also had an established diagnosis of obstructive sleep apnea which worsened with his erythrocytosis, requiring a repeat sleep study for

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further management. His elevated PSA (5.9 ng per deciliter) was the final adverse effect that prompted cessation of the replacement therapy. Further workup and studies were performed by the patient's urologist.

Conclusion: Testosterone replacement therapy is not a benign process. Screening of the general population and treatment of non-symptomatic patients are not recommended. Treatment of elderly patients may be ineffective and should be considered on a case-by-case basis. Underlying causes of hypogonadism must be evaluated. Once therapy has started close monitoring of serum testosterone, hematocrit, and prostate-specific antigen levels are mandatory.

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#### 4.DRESS Associated with Vancomycin Use: Case reports and review of the literature

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**ABSTRACT:** Drug rash with eosinophilia and systemic symptoms (DRESS) syndrome is a rare systemic reaction characterized by fever, rash, and multi-organ system involvement. It was first described in the 1930s, but the underlying pathogenesis has yet to be fully understood. While DRESS was initially associated with anticonvulsants, other medications including antibiotics have been found to produce a similar phenomenon. Of all antibiotics, penicillins and sulfonamides have been the most frequently associated with this syndrome. Over the past decade, however, vancomycin is being increasingly recognized as an additional antibiotic associated with DRESS. In this report, we describe 2 cases of DRESS associated with vancomycin use. We have compiled all the cases of DRESS secondary to this antibiotic reported in the literature to date.

**Keywords:** drug rash with eosinophilia and systemic syndrome (DRESS)

**INTRODUCTION:** Drug reaction with eosinophilia and systemic symptoms (DRESS) syndrome, also known as drug-induced hypersensitivity syndrome (DIHS), is a potentially life-threatening idiosyncratic reaction characterized by morbilliform rash with fever, lymphadenopathy, and multi-organ involvement. (1, 2) It was previously described as “drug-induced pseudolymphoma” after certain patients developed lymphadenopathy following administration of the anticonvulsant drug hydantoin. (3, 4) Subsequently, a new term, “anticonvulsant hypersensitivity syndrome” (AHS) was introduced after some patients developed this syndrome with carbamazepine. (3) Since then other medication classes including antimicrobials, antidepressants, and biologic monoclonal antibodies have led to this type of hypersensitivity

syndrome. (1, 3) As these drug-associated phenomena became more widely described in the medical literature, Bocquet et al coined the new term DRESS that supplanted use of the term AHS. (5).

**CASES:** Key features of the cases we encountered have been outlined below. Laboratory findings on admission have been tabulated in Table 1. In both the cases, there was a temporal relationship between the use of vancomycin and development of DRESS. No new medications other than the implicated antibiotic were prescribed in these patients. Also, no alternative cause for the constellation of signs, symptoms, and laboratory findings was discerned in these cases.

**Case 1:** A 44-year-old female was evaluated in the hospital for abdominal discomfort, fevers, generalized rash, and facial swelling of one week duration. She was discharged about a month prior on vancomycin for a sternal wound infection secondary to *Staphylococcus aureus*. On exam, she was febrile, tachycardic, and had a diffusely tender abdomen. Urine analysis revealed pyuria; so a diagnosis of sepsis secondary to urinary tract infection was made.

	CASE 1	CASE 2
WBC (cells/mm <sup>3</sup> )	13.6	11.5
Neutrophils (%)	72	76
Bands (%)	20	0
Eosinophils (%)	3	10
AST (IU/L)	4873	12
ALT (IU/L)	1954	12
ALP (IU/L)	212	70
Total	5.3	0.5
Bilirubin(mg/dl)		
Creatinine (mg/dl)	4.4	1.7

She was started on empiric cefepime, which was discontinued the next day as urine cultures were negative. Her fevers persisted and blood cultures did not reveal any microbial growth. No other focus of infection was identified. Hepatitis panel was negative. Computed tomography (CT) scan of the chest did not reveal any abscess; abdominal and renal ultrasound was also unremarkable. Lab values showed markedly elevated liver enzymes and serum creatinine. In the absence of an alternate etiology, a diagnosis of DRESS secondary to vancomycin was made. Vancomycin was discontinued and steroids were started for severe systemic involvement. Histopathology from skin biopsies revealed vacuolar interface dermatitis with necrotic keratinocytes, spongiosis, focal parakeratosis, and eosinophils with no vasculitis, consistent with a drug hypersensitivity eruption (fig 1). The rash disappeared and lab values normalized after about a month.

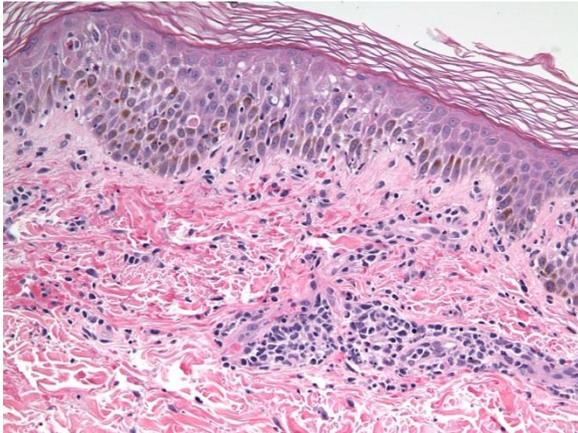


Figure 1

Case 2: A 52-year-old man presented with a 3 day history of progressively worsening diffuse rash and fever. He was admitted to our hospital a month earlier, diagnosed with *Streptococcus intermedius* bacteremia and discharged on vancomycin. He had received the antibiotic for 3 weeks before the onset of rash. On initial evaluation by his primary care provider, a vancomycin-induced histamine-release syndrome was suspected and the infusion rate was decreased. Despite lowering the infusion rate, the rash progressively worsened over the next two days. On exam, he had fever, facial swelling, and a diffuse, erythematous, macular rash. Over the next several days, the serum creatinine increased and eosinophilia developed. Blood cultures and urine cultures remained negative. DRESS was suspected and vancomycin was discontinued. The rash resolved in a few days after the cessation of vancomycin and lab studies had normalized in a couple of weeks.

DISCUSSION: DRESS is a clinical entity with an estimated incidence between 1:1000 to 1:10000 in the general population. (1,3,5,6) Its pathogenesis is not fully understood, but a few different hypotheses have been proposed: abnormalities in drug metabolism and detoxification, delayed cell-mediated immune response in which medications act directly as antigens or indirectly as haptens, immune suppression with decreased total B-lymphocyte counts and serum immunoglobulin levels, and herpes virus reactivation. (1, 3, 7- 9) Clinical signs of DRESS occur most often 2 to 6 weeks after initiation of the offending medication and usually include fever and rash. (9, 10)

**TABLE 2: DIAGNOSTIC CRITERIA FOR DRESS SYNDROME**

Bocquet et al.	RegiSCAR	J-SCAR
Cutaneous Drug Eruption	Acute Rash - $\geq 50\%$ BSA - $\geq 2$ of facial edema, peripheral edema, infiltration, desquamation	Onset of maculopapular rash after 3 weeks of starting medication
Hematologic Abnormalities - Eosinophilia - Atypical Lymphocytosis	Hematologic Abnormalities - Eosinophilia - Atypical Lymphocytosis	Hematologic Abnormalities - Eosinophilia - Atypical Lymphocytosis - Leukocytosis
Systemic Involvement	Internal Organ Involvement  Lymphadenopathy (2 sites $>1\text{cm}$ )  Fever $\geq 38.5^\circ\text{C}$  Disease duration $>15$ days  At least 3 lab studies to rule out alternative cause	Liver Abnormalities (AST $>100$ )  Lymphadenopathy  Fever $\geq 38.5^\circ\text{C}$  Prolonged clinical symptoms 2 weeks after medicine discontinuation  HHV6 Reactivation

The classically observed rash is erythematous with involvement of the face, trunk, and upper extremities with eventual spreading to the lower extremities and ultimately the entire body surface. (1, 9) Additional symptoms are most commonly due to the involvement of the lymphatic, hepatic, and hematologic systems. (9) These findings were present in our above reported patients. Liver is the most common visceral organ involved, with varying degree of hepatitis that range from asymptomatic to fulminant liver failure associated with hepatic necrosis; the latter pathology is the primary underlying cause of death in DRESS with transplantation being the only effective treatment option. (1, 5) Although the term DRESS encompasses eosinophilia, clinicians should be aware of the fact that eosinophilia is seen in only about 30% of cases and can be delayed for one to two weeks after onset of symptoms. (11) Therefore, absence of this hematological finding should not exclude the suspicion for this syndrome. Other involved organ systems may include renal, pulmonary, and cardiac. Renal involvement may only be apparent through elevation of serum creatinine. Pulmonary manifestations may include pneumonitis or pleuritis, but at its extreme can cause acute respiratory distress requiring mechanical ventilation. (1, 11) Cardiac manifestations include pericarditis or myocarditis. The latter can be either self-limited hypersensitivity myocarditis which responds to immunotherapy or acute necrotizing eosinophilic myocarditis which is associated with 50% mortality rate. (1, 11)

Neurologic, gastrointestinal, and endocrine involvement is encountered infrequently. (11) Diagnosis of DRESS is challenging because many of the clinical features are non-specific. Furthermore, these symptoms often mimic common dermatologic, infectious, neoplastic, or rheumatologic conditions. Currently there are three diagnostic scoring systems for DRESS syndrome (Table 2). Bocquet et al. was the first to propose a scoring system which required presence of the following three criteria for diagnosis of DRESS: cutaneous drug eruption, hematologic abnormalities with eosinophilia or atypical leukocytes, and involvement of at least one other organ system. (5) In the recent years, two additional diagnostic scoring systems, RegiSCAR and J-SCAR, have been developed by the European Registry of Severe Cutaneous Adverse Reaction and the Japanese Research Committee on Severe Cutaneous Adverse Reaction, respectively. (Table 2). Immediate cessation of the suspected offending medication is the mainstay in management of DRESS. (2, 14) Antipyretics and in severe cases with end organ involvement, systemic corticosteroids may be administered. Controlled studies are, however, lacking to definitely substantiate the need for steroids. If treated promptly, the majority of patients with DRESS recover completely with no long-term sequelae. Some individuals, however, may develop lifelong systemic involvement with the complication of hepatic necrosis resulting in a 10% mortality rate. (2, 9,11).

Table 3. Cases of Vancomycin induced DRESS reported in the literature

Year <sup>(ref)</sup>	Sex/Age	Indications For Vancomycin Use	Organ Involvement*					
			CNS	Cardiac	Pulmonary	Hepatic	Renal	Lymphatics
1997 <sup>21</sup>	M, 51	Endocarditis					+	
2005 <sup>19</sup>	F, 56	Bacteremia MRSA				+		+
2005 <sup>22</sup>	F, 45 <sup>+</sup>	Endocarditis Staph. spp				+		+
2006 <sup>18</sup>	M, 50	Vertebral Osteomyelitis			+			+
2007 <sup>26</sup>	F, 52	Otitis Media MRSA				+		+
2008 <sup>17</sup>	F, 60	SSTI MRSA						+
2009 <sup>24</sup>	M, 60 <sup>+</sup>	Bacteremia MRSA				+		
2009 <sup>20</sup>	F, 38	Endocarditis Strep. oralis						+
2010 <sup>31</sup>	M, 66	Prosthetic knee infection			+			+

Although antiepileptics have been most commonly implicated in DRESS, clinicians should be aware that antibiotics have also been associated with this syndrome. A thorough medication history should be obtained in patients who present with fever, rash, and eosinophilia since early cessation of implicated drug is likely to improve outcomes. Of note, rash that does not disappear even after slowing the rate of infusion of vancomycin should not be attributed to histamine release alone (red man syndrome); a more serious underlying issue may be brewing. Vancomycin has been

increasingly recognized as a culprit agent in DRESS. This is likely owing to increasing use of this antibiotic to treat resistant Gram positive infections. We have outlined salient features of all cases of DRESS due to vancomycin reported so far in the literature to date in table 3. Reporting of such cases will add to the knowledge base of clinicians and pharmacists, and minimize untoward reaction from drugs in clinical practice by early detection and timely discontinuation of culprit agents.

Acknowledgement: We thank Dr William Bivin from pathology for help with the pathology slides.

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## 5. Accessory Ovary Diagnosed by Ultrasonography: Case report and review of literature

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**ABSTRACT:** Ectopic ovaries are rare entities and can present as a palpable mass, pelvic pain, dyspareunia, irregular menses, persistent menstruation following bilateral oophorectomy, and infertility. If an ectopic ovary is encountered at imaging, close evaluation the uterus, Fallopian tubes and kidneys should be performed due to its association with Mullerian duct anomalies and renal agenesis. If there is suspicion based on imaging findings, it has been suggested to perform an ovarian stimulation test with clomiphene citrate with repeat imaging to evaluate for the presence of follicles to confirm the diagnosis. The same pathologic conditions that are encountered in eutopic ovaries can occur in ectopic ovaries.

**Keywords:** accessory, ectopic, supernumerary ovary

**INTRODUCTION:** Ectopic ovaries, whether accessory or supernumerary, are rare entities with about 50 cases reported in the literature. This is the 23<sup>rd</sup> reported case of an accessory ovary and first report of an accessory ovary diagnosed incidentally by ultrasound. The remaining cases have been found surgically or at autopsy. Many cases of accessory ovaries were incorrectly labeled as lymph nodes because most are smaller than eutopic ovaries (1,2).

**CASE REPORT:** A 20 year old Hispanic female presented to our imaging department for evaluation of irregular menses. At ultrasonography, two distinct ovaries were identified, one in each adnexa, that were normal in size and morphology. An additional soft tissue mass medial to the left ovary was identified that contained small cysts and therefore deemed an accessory ovary [Figures 1 and 2]. To date, no histologic correlation has been performed.



Figure 1



Figure 2

**DISCUSSION:** Wharton classified ectopic ovarian tissue into three categories in 1959: lobulated, supernumerary and accessory. Lobulated ovaries

are ones in which the ovary is divided into two or more lobules by one or more clefts. A supernumerary ovary is a third ovary that is entirely

separated from the other two with a separate blood supply. An accessory ovary is one in which it is located near, or in direct connection with, a normally positioned ovary (1). Lachman proposed a new classification in 1991 in which the described condition should be labeled as "ectopic ovary" and then further classified as post-surgical implants, post-inflammatory implants or true embryologic ectopic ovaries. Conditions that predispose patients to having ectopic ovarian tissue include prior pelvic surgery, endometriosis, pelvic inflammatory disease, ectopic pregnancy or adhesions (3).

Two proposed mechanisms for the formation of a supernumerary ovary are: 1) arrested migration of a gonocyte as it passes retroperitoneally through the dorsal mesentery and then exerting its inductive influence on surrounding epithelium with ectopic ovarian tissue forming as a result; or 2) transplantation of gonadal ridge cells along the gonocytes' migratory path in advance of the gonocytes themselves, that, when they join the gonadal ridge cells, the two cell lines interact and mature ovarian tissue develops (2). As an accessory ovary is in close proximity to the eutopic ovary, it may occur from abnormal separation of a small part of the developing and migrating ovarian primordium (4). Wharton reported that in 3 of the 4 cases of supernumerary ovaries and in about 26% of the cases of accessory ovaries, additional anomalies were found including bicornuate and unicornuate uteri, bifid fallopian tubes, renal and ureteral agenesis, duplicated ureter, bladder diverticulum, and accessory adrenal gland (1). It is well known that Mullerian duct anomalies are associated with ectopic ovaries with 20% occurring with uterine agenesis and as high as 42% with unicornuate uterus (5). Common complaints of

patients who were found to have ectopic ovaries include palpable mass, pelvic pain, dyspareunia, irregular menses, persistent menstruation following bilateral oophorectomy, and infertility. Many reported cases were discovered because of a pathologic condition occurring in an ectopic ovary as they can have the same pathologic processes as eutopic ovaries. Case reports include serous cystadenoma (6-8), dermoid (8-10), Brenner tumor (11), sclerosing stromal tumor (12), fibroma (4,13), and ovarian torsion (14). If there is clinical suspicion for the presence of an ectopic ovary or if a soft tissue mass is found in the pelvis at sonography or MRI that suggests an ectopic ovary, an ovarian stimulation test can be performed. This entails the use of clomiphene citrate and repeat imaging. If the questionable tissue is ovarian in origin, then numerous follicles should be easily identified and confirm the diagnosis. It has been suggested that women with proven unicornate uteri have an ovarian stimulation test even without a questionable finding at ultrasound or MRI as the incidence of ectopic ovary is much higher in this population (5).

CONCLUSION: Ectopic ovaries are rare entities but close inspection of the pelvis should always be performed in women who present with the above symptoms. If an ectopic ovary is encountered at ultrasound, closely evaluate the uterus and Fallopian tubes for anomalies, and possibly even the kidneys due to its association with renal agenesis. If there is suspicion based on sonographic findings, it has been suggested to perform an ovarian stimulation test in which the patient takes clomiphene citrate and returns for repeat imaging to evaluate for the presence of follicles to confirm the diagnosis of ectopic ovary (5,15).

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## 6.Right Brachial Arterial Access: A Viable Alternative to the Femoral Artery Approach for Stent-supported Angioplasty

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Introduction: The common femoral artery has traditionally been the preferred access site for neuroendovascular intervention. This has been attributed to the artery's large caliber, superficial location, disease-free tendency, and ease of compressibility against the femoral head for puncture site closure. However, when aortoiliac disease or variant aortic arch anatomy complicates the femoral approach, an alternate means of access is often necessary. Bovine aortic arch, found in approximately 13% of individuals, refers to a common origin of the brachiocephalic trunk and left common carotid artery (1). Manipulation of a catheter to access a stenosed artery superior to this type of arch becomes impractical as a parallel manipulation of the catheter would be required. Similarly, a type II aortic arch (origins of the supraaortic vasculature arise between the upper and lower borders of the arch) makes the transfemoral approach problematic, as they entail increased angling of the catheter and guidewire. Severe peripheral vasculature disease of the aorta and iliac arteries also complicates the femoral artery approach. Atherosclerotic plaque is commonly encountered in older individuals, who are often the target population for treatment of arterial stenoses. Furthermore, catheter manipulation in diseased arteries increases the theoretical risk of plaque disruption and consequent distal embolic phenomena. When the

femoral approach is undesirable for the abovementioned reasons, alternate routes of access must be sought. The transbrachial and transradial approaches are being increasingly used for neuroendovascular intervention as their viability is being established. We report three cases of successful stent-supported angioplasty of the cervical carotid and vertebral arteries using the right brachial artery approach.

Case 1: An 82-year old male presented to our institution with right hand numbness. Magnetic resonance angiography (MRA) demonstrated a high-grade stenosis of the cervical left internal carotid artery (ICA). Stent-supported angioplasty through the femoral artery was aborted as bovine arch anatomy complicated access to the left ICA. [Figure 1: Digital subtraction angiography (DSA) demonstrating bovine aortic arch anatomy via the femoral approach (LEFT image). Volume-rendered image utilizing CT scan data depicting bovine aortic arch anatomy (arrow; RIGHT image)]. The patient returned for stent-supported angioplasty via a right brachial artery approach. Arteriography of the left carotid bifurcation demonstrated a critical stenosis at the left internal carotid artery origin. Following predilation, a carotid artery stent was deployed followed by post-angioplasty utilizing a balloon inflated up to approximately 12 atmospheres (atms). Excellent relief of the stenosis was obtained. Cervical and intracranial

angiography demonstrated satisfactory patency of the stent and restoration of anterior flow to both anterior cerebral arteries. [Figure 2: Volume-rendered image demonstrating stenosis of the left internal carotid, just distal to the bulb region (red

circle; FAR LEFT image). DSA image again demonstrating critical left ICA stenosis (yellow circle; MIDDLE image). Resolution of the stenosis status post stenting via the brachial approach (FAR RIGHT image)]



Figure 1



Figure 2

Case 2: This patient was found to have high-grade stenosis of the right vertebral artery on an MRA. A prior CT also depicted a type II aortic arch. An initial attempt via the right common femoral artery approach proved arduous. A 5-French pigtail catheter was advanced into the ascending aorta and a type II aortic arch was identified. This complicated the procedure and the femoral approach was abandoned in favor of a right brachial approach. [Figure 3 left image demonstrates severe stenosis of the right vertebral artery with area of ulceration (black circle).] A 6-French Envoy catheter was successfully positioned within the right vertebral artery (proximal segment). The ulcerative atherosclerotic lesion was identified at the lower portion of the right vertebral artery. The stent was deployed at 9 atms. Post-imaging demonstrated excellent resolution of the stenosis and diminished flow into the ulcer. [Figure 3 right image demonstrates resolution of vertebral artery

stenosis and ulceration status post stent assisted angioplasty via the brachial approach].

Case 3: Diagnostic CT angiogram (CTA) was performed and showed diffuse atherosclerotic plaque involving the aortic arch with 70% ostial stenosis of the innominate artery. The femoral approach was initially attempted, but was unsuccessful for several reasons. A type II aortic arch, combined with diffuse atherosclerotic disease of the aorto-iliac arteries made the femoral approach unsafe and impractical [(Figure 4: DSA image demonstrating high-grade stenosis of the right common carotid artery (black circle), occlusion of the left common carotid artery ostium (open arrow), and a type II aortic arch (blue circle), LEFT image. Stenosis of the right common iliac artery demonstrated via the initial femoral approach (black circle; RIGHT image)]. Angiography and stent-angioplasty were then performed through a transbrachial approach.



Figure 3

Access was obtained to the right common carotid artery with a 5-French shuttle sheath, while successfully navigating the underlying subclavian stenosis and vascular tortuosity. Angiography of the right carotid bifurcation demonstrated a critical tandem stenosis of the cervical right common carotid artery. Angioplasty utilizing a 5.0 mm balloon was performed.

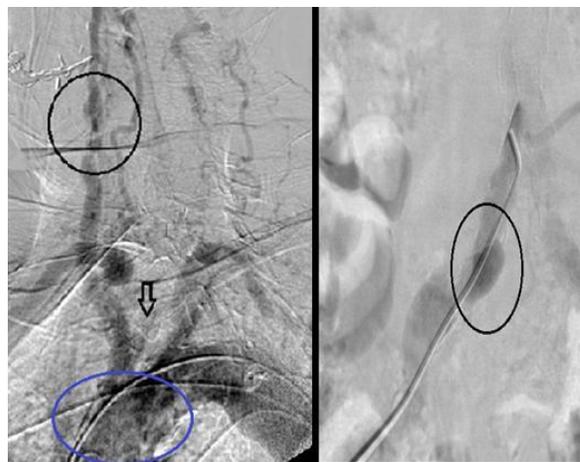


Figure 4

Repeat angiography demonstrated satisfactory patency of the stent and relief of stenosis. [Figure 5: DSA images demonstrate tandem high grade stenoses of the right common carotid artery (red arrows; LEFT image). Resolution of both stenoses status post stent angioplasty of the right common carotid artery (RIGHT image)].

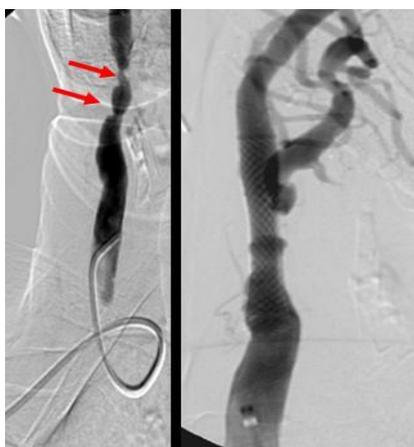


Figure 5

Discussion: Femoral arterial access has long been considered the standard approach for endovascular intervention amongst interventional radiologists. However, this approach may not be ideal in all cases. In patients with aorto-iliac disease or occlusion and those with type II, an alternative approach is desired. Femoral access may also not be feasible in patients with an elongated arch and brachiocephalic trunk, morbid obesity, or previous iliofemoral graft placement (2). The transbrachial approach for angiography has traditionally not been favored due to the reported increased complication rates compared to the femoral route.

However in a study of 1,326 patients undergoing peripheral angiograms via brachial artery puncture, Armstrong et al. found that brachial puncture could be safely performed in patients, noting a complication rate of 1.28% (3). In their study, the authors suggested that brachial access be considered a primary choice for diagnostic angiography. The transbrachial approach (TBA) for endovascular intervention has been investigated by previous studies. Heenan et al. performed 62 brachial artery punctures in 53 patients for various diagnostic and interventional purposes, noting that TBA was a low-risk alternative in patients in whom the femoral approach is contraindicated (4). Montorsi et al. describes successful carotid artery stenting via the right brachial approach in 14 patients with bovine aortic arch and left ICA stenosis, noting no vascular complications and no in-hospital or 30-day cardiac or cerebral major adverse events (5). These studies conclude that the transbrachial approach is a safe and practical means of endovascular access.

Conclusion: Our case reports confirm the safety, viability and efficacy of the transbrachial approach for successful stent-supported angioplasty of severe cervical carotid and vertebral artery stenosis. Obviously, however, further investigation with large-scale studies is needed to confirm the

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## 7.Sigmoid Volvulus: case report and review of the literature.

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Case: A 51 year old female patient with no significant medical or surgical history presented to Hahnemann University Hospital with a 3 day history of abdominal pain, nausea and vomiting. She was hemodynamically stable and physical exam revealed only for mild abdominal tenderness and distention. An abdominal radiograph showed a vertically oriented, C-shaped loop of mildly dilated large bowel with the apex in the upper midabdomen and the base of the loop within the pelvis. These findings were thought to be suspicious for sigmoid volvulus, and contrast enhanced computed tomography of the abdomen and pelvis was subsequently performed. CT scan confirmed the presence of sigmoid volvulus. Endoscopic detorsion was performed without complication and the patient remained stable throughout her clinical course. Prior to discharge, she was seen by general surgery and advised to undergo elective laparoscopic sigmoid colectomy for prevention of volvulus recurrence. This was performed without complication and the patient was discharged home in excellent condition. She has not experienced recurrence of symptom.

Discussion: Sigmoid volvulus occurs when the sigmoid colon twists about its mesentery. Depending on the degree and severity of the volvulus, large bowel obstruction or ischemia can result. Although relatively uncommon in the United States, it is one of the most common causes of intestinal obstruction worldwide. Certain underdeveloped countries, sometimes referred to as the "volvulus belt," experience particularly high rates of this condition. These include parts of Latin America, Africa, the Middle East and other regions. In these endemic areas, sigmoid volvulus accounts for 20-54% of all acute intestinal obstructions. In contrast, only 3-5% of bowel obstructions in developed nations such as North America and Western Europe are caused by sigmoid volvulus, with colon cancer and diverticulitis comprising a much larger proportion (1-3). A long, redundant sigmoid colon and mesocolon are required for volvulus to occur.

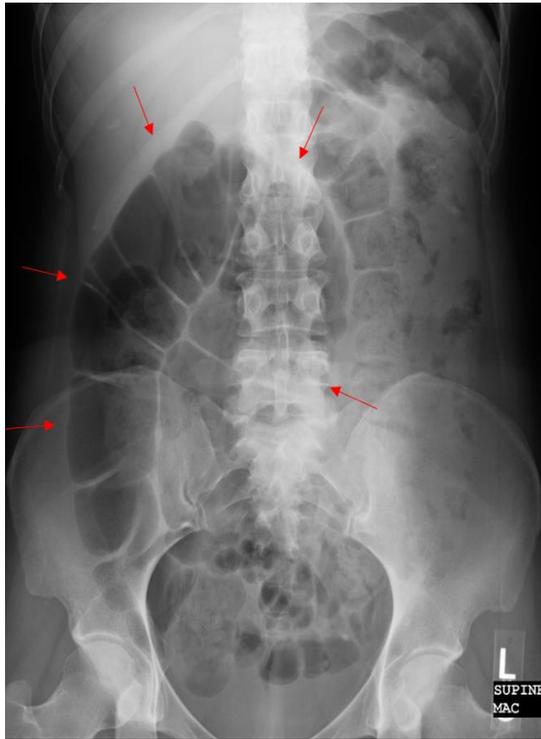


Figure 1: Supine abdominal radiograph performed in the emergency department, showing a vertically oriented, C-shaped loop of dilated sigmoid colon with the apex in the upper midabdomen (arrows). Findings were concerning for sigmoid volvulus.

Dietary factors play an important role in the development of such a volvulus-prone sigmoid, with excessive fecal loading thought to represent the major predisposing factor (4). Most sigmoid volvulus in developed nations occurs in elderly nursing home and neuropsychiatric patients, and is thought to be related to chronic constipation. Conversely, the fiber-rich diets common in developing countries account for the fecal loading in the latter (5). The rarity of this condition in patients under the age of 30 suggests that it is largely acquired rather than congenital, although familial occurrences and strong racial and gender predilections also exist (6). As the sigmoid colon progressively distends, the antimesenteric border lengthens more than the mesenteric border due to the tethering effect of mesentery and vessels. This differential elongation eventually results in twisting. Torsion of the mesosigmoid of at least 180 degrees is required for bowel obstruction to occur. If the degree of torsion exceeds 360 degrees, bowel ischemia can result due to compression of the vascular pedicle (1, 8). The clinical presentation of sigmoid volvulus depends on several factors. The

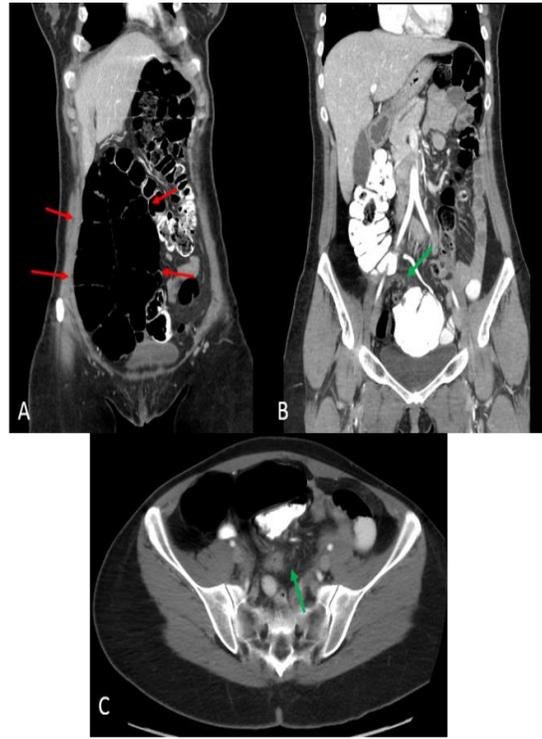


Figure 2: (A) Coronal CT image showing the dilated, C-shaped loop of sigmoid colon (red arrow). (B) Coronal and (C) axial CT images demonstrating the twisting sigmoid mesentery root (green arrows).

most important variable is the rapidity of the twisting. This determines whether the disease assumes an acute, indolent or recurrent course. The former presents with sudden onset severe abdominal pain and distention, vomiting, hematochezia, shock, and other signs of acute abdominal pathology (9). The indolent course presents with mild abdominal pain, with vomiting seen later in the disease course. Diarrhea may be a red herring as it is sometimes seen in intermittent or indolent volvulus. The degree of torsion is another important factor affecting clinical presentation. As discussed above, twists of greater than 360 degrees may compromise the vascular supply to the sigmoid and thus lead to signs and symptoms of ischemic bowel (1). Since the clinical presentation is often variable and nonspecific, the diagnosis is made radiographically. Plain radiographs are diagnostic in the majority (57-90%) of patients, and numerous plain radiographic signs of sigmoid volvulus have been reported in the literature. Many of these describe the appearance of the distended, anhaustral sigmoid loop itself, most commonly referred to as the “coffee bean”

sign. Other signs describe an atypical location of the sigmoid loop apex, such as under the left hemidiaphragm, overlapping the liver, or above the T10 vertebral level. Secondary signs such as absence of gas in the rectum are less specific but can be helpful in equivocal cases (10).

Despite the relatively high sensitivity of plain radiographs for diagnosis of sigmoid volvulus, false positive and false negative cases do occur. Therefore in regions where advanced cross sectional imaging is readily available, the diagnosis is always confirmed with CT or less commonly MRI. Identification of the twisted mesenteric pedicle is diagnostic. This appears as a soft tissue mass at the fulcrum of the volvulus (i.e. the left lower quadrant) which appears to “whirl” as consecutive images are viewed. This is referred to as the “CT whirl” sign. An additional benefit of CT is more sensitive detection of signs of bowel ischemia such as sigmoid colonic wall thickening or gas (11). Standardized treatment for sigmoid volvulus is relatively well-established in developed countries. Endoscopic derotation and decompression is the emergent therapy of choice to relieve obstruction and prevent or potentially reverse bowel ischemia (12). If bowel ischemia is suspected based on clinical or radiographic grounds, endoscopic management is foregone as this can lead to perforation and peritonitis. In these cases, emergent laparotomy with manual detorsion

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and sigmoid resection is indicated. This is followed either by primary anastomosis (emergency resection and primary anastomosis, ERPA) or colostomy with Hartmann's procedure. There is debate over the preferred surgical treatment for sigmoid volvulus with ischemia (1, 4). Recurrence of volvulus is not uncommon after endoscopic decompression and detorsion, occurring in over 50% of patients (4). Therefore, even in patients such as ours without bowel ischemia, nonemergent surgery within 2 days of resolution and resuscitation is typically performed to prevent recurrence (12). Elective open resection of the sigmoid colon with anastomosis is the gold standard, although nonresective alternatives have been advocated. These include sigmoidopexy, endoscopic T-fastener fixation, tube sigmoidostomy, and extraperitonealization of the colon (1, 4).

Conclusion: Although sigmoid volvulus is encountered infrequently in developed countries, it may present with partial or complete bowel obstruction or, in the case of acute torsion, bowel ischemia and acute abdomen. It is therefore critical for emergency medicine, surgery and radiology physicians to be familiar with the presentation, radiographic diagnosis and management of this disease. Captions for diagnostic imaging:

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## 8. Traumatic Cervical Arterial Injury: a case report series

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**Background and Purpose:** Neck trauma is a common life threatening emergency room presentation. The spectrum of injury spans various entities including limited soft tissue injury, traumatic vascular dissection, and spinal cord transection. The purpose of our case series is to accurately identify and manage cervical arterial injury.

**Summary of Cases:** We review three cases of incomplete vascular transection in an adult and pediatric patient secondary to gunshot wound. An ancillary case of iatrogenically induced carotid-jugular fistula is also presented. We aim to describe the vascular techniques employed with a focus on imaging findings at presentation, during endovascular treatment, and follow up imaging. Sonographic, conventional angiographic, digital subtraction angiographic, and enhanced cross-sectional imaging modalities are highlighted.

**Conclusion:** Cervical arterial injury is an emergent, life-threatening event that requires timely and accurate diagnosis and management.

**Introduction:** Penetrating neck trauma accounts for approximately 1% of all adult traumatic injury in the United States (1). Accounting for nearly half of all penetrating neck injuries are gunshot wounds, followed by stab injury (1). Nearly 40% of these patients experience no significant damage (1).

However, major venous injury occurs 15-25% of the time, followed by arterial injury occurring at 10-15% (1). Further literature analysis reveals that 22% of arterial vascular injury affects the carotid arteries, followed by vertebral artery injury occurring 10% of the time (2). Conventional arteriography remains the gold standard for evaluation of vascular integrity and damage, as it encompasses both diagnostic capabilities and allows for simultaneous therapeutic intervention if necessary. Endovascular intervention for penetrating vascular injury includes covered stent graft placement, embolization or coiling, or vascular occlusion.

**Case 1:** A three year old female presented to the emergency room with profuse bleeding after a gunshot wound to the left neck. Manual pressure was applied while emergent left carotid angiography was performed. A distal left common carotid artery pseudoaneurysm was demonstrated to project posterolateral to the arterial wall, approximately one centimeter (cm) proximal to the carotid bifurcation (Figure 1: Conventional angiography, left lateral oblique view demonstrates a left common carotid artery (CCA) pseudoaneurysm denoted by an arrow; LEFT image.)



Figure 1

A stiff exchange wire was positioned within the left internal carotid artery. A diagnostic catheter and sheath were exchanged for a 6 French femoral sheath, followed by placement and implantation of a balloon mounted 6x18 millimeter (mm) Atrium\* covered stent. The stent was positioned and deployed to overlie the site of arterial tear. Diagnostic angiography confirmed complete closure of the tear, hemostasis of the injury, and satisfactory reconstruction of the common carotid wall (Figure 1: Conventional angiography, left lateral oblique view. Resolution of pseudoaneurysm without evidence of active contrast extravasation status post artery stent deployment denoted by an arrow; RIGHT image).

Case 2: A middle-aged adult male presented to the emergency room with a gunshot wound to the right face. The bullet fractured the right mandible and traversed the right lower neck, ultimately terminating lateral to the uncovertebral joint between the fourth and fifth cervical vertebral level (Figure 2: Axial, enhanced CT neck. Ballistic fragment overlying the right uncovertebral joint

denoted by an arrow; LEFT image). Computed tomography (CT) angiography demonstrated intimal irregularity of the posterior wall of the right common carotid artery (Figure 2: Axial, enhanced CT neck. Right carotid artery intimal irregularity denoted by a yellow arrow and normal left carotid artery bifurcation denoted by a red arrow; RIGHT image). Subsequent digital subtraction angiography demonstrated localized contrast extravasation with traumatic pseudoaneurysm formation at the distal right common carotid artery (Figure 3: Digital Subtraction Angiography (DSA), Lateral Oblique View. Distal right common carotid artery demonstrates active contrast extravasation and pseudoaneurysm formation denoted by an arrow; LEFT image). A Boston Scientific Wallgraft was emergently deployed over the lesion. Repeat angiography demonstrated resolution of contrast extravasation and normal flow through the newly placed covered stent (Figure 3: DSA, Lateral Oblique View. Resolution of contrast extravasation status post covered-stent placement; RIGHT image).

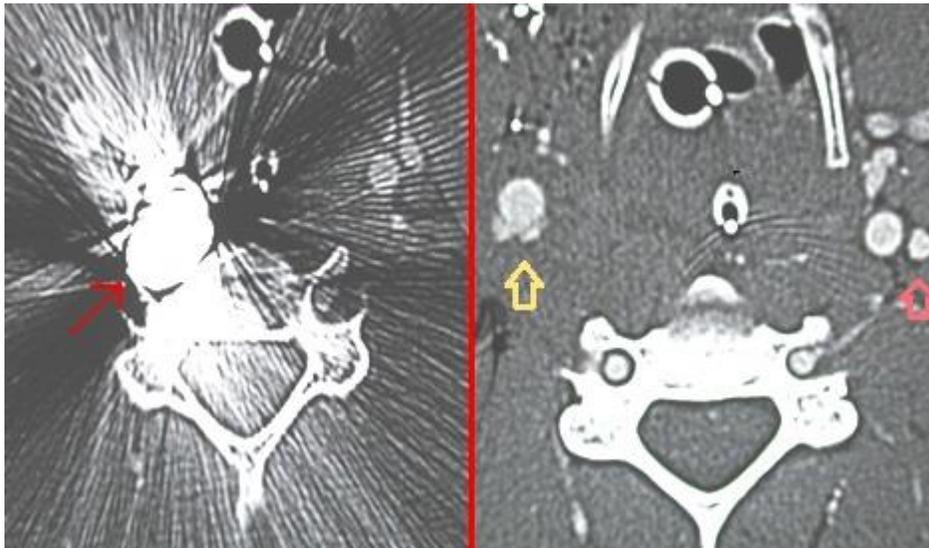


Figure 2

**Case 3:** An adult male underwent non-emergent myocardial biopsy status post cardiac transplantation to assess for rejection. Access to the right ventricle was obtained via the right internal jugular vein. During this procedure, the catheter traversed the posterior wall of the jugular vein and punctured the common carotid artery, forming a fistula per cardiology consultation. The patient was observed during a one week hospital stay to allow for spontaneous fistula closure. Ultrasound demonstrated persistence of the fistula (Figure 4: Right common carotid artery-internal jugular vein fistula. Transverse grayscale ultrasound image. CA common carotid artery, F fistula, JV internal jugular vein). Digital subtraction angiography (DSA) demonstrated a right common carotid- internal jugular fistula with a central pseudoaneurysm (Fistula 5: DSA, Lateral Oblique View . Common carotid artery-internal jugular vein fistula; LEFT image). The fistula demonstrated a small caliber arterial neck, and a relatively small caliber venous defect, situated along the upper margin of the pseudoaneurysm.



Figure 3

The pseudoaneurysm was embolized with detachable coils including, 8mm x 20cm and 6mm x 11cm GDC soft coils and 2mm x 5cm, 2mm x 4cm, and 2mm x 3cm fibered vortex coils. Post embolization imaging demonstrated a small residual neck (Figure 5: DSA, Lateral Oblique View. Status post coil embolization demonstrates a wisp of contrast within the fistula denoted by an arrow; RIGHT image). Approximately one week later, repeat ultrasound examination demonstrated complete fistula closure (Figure 6: Sagittal, color Doppler ultrasound image one week later demonstrates fistula closure without evidence of active contrast extravasation with 'COIL' denoting approximate site of intervention).

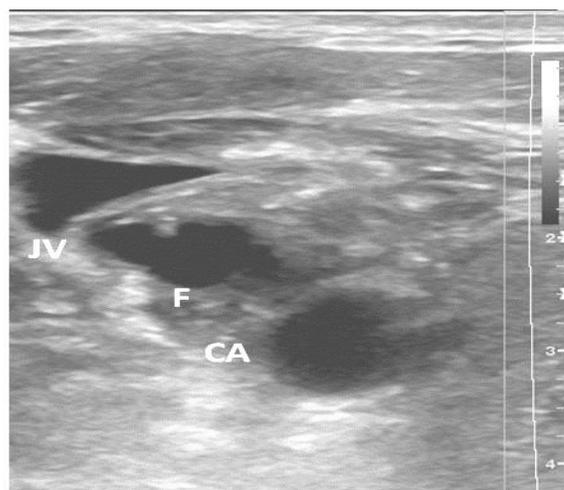


figure 4

**Discussion:** Penetrating trauma to the skull base and carotid arteries can result in vascular occlusion, pseudoaneurysm formation, or rupture. Management strategies for these lesions are contentious as surgical carotid ligations are performed, but are associated with higher mortality rates. Kim et al. described a patient who subsequently developed a cerebral embolic infarction nine hours postoperatively (3). Bradley et al. described a group of carotid ligation patients who developed postoperative neurological deficits (4). In each case, patency of the effected vessel was proven, but hemorrhagic cerebral infarction led to their subsequent demise. Carotid ligations are obligatory when arteries have suffered a complete transection (5, 6).

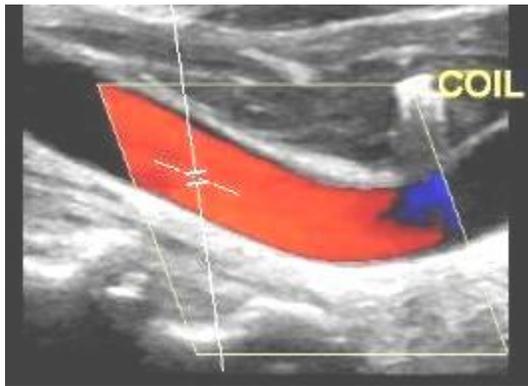


Figure 5 (top) and Figure 6(bottom)

Endovascular treatments are the preferred management strategy amongst interventional radiologists due to lower mortality rates and faster

recovery times. Herrera et al. supported this circumstance with endovasculartherapyresearch, resulting in documented lesion occlusion in 34 (94.4%) patients (7). Clinical improvement was documented in 35 (97.2%) patients, with one procedure-related fatal complication

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## 1. Capacity and Consent in the Alzheimer's Obstetric Patient

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A G2P1 patient in her thirties presented to the labor and delivery suite in active labor. She had no significant medical history with the exception of early onset Alzheimer's disease, which was familial. On arrival, the patient's husband mentioned that her condition "waxes and wanes", and that a month or so prior, she forgot that she was pregnant. Both the patient and her husband agreed, however, that she was more lucid on the day of admission. When it came time for the epidural to be placed, we reviewed the risks and benefits of the procedure and she reconfirmed her understanding using her own words. We deemed she had capacity to make her own informed decision about the epidural placement at that time, and the procedure was performed without any complications. Physicians have an ethical and legal obligation to provide the patient with the appropriate knowledge to enable them to make decisions about their own care (1).

In a world where we are turning away from paternalistic medicine and instead actively involving the patient in their own choices with a focus on autonomy, consent is crucial. When obtaining informed consent, information that must be provided includes an overview of the proposed procedure, who will be performing the procedure, what the alternative treatment options are, the risks and benefits of all treatment options, and the risks and benefits of forgoing treatment. In determining what risks should be outlined with the patient, guidelines have been developed over the past years to include risks that occur frequently, even if they are minor, and any risks, such as death, that are major, even if they occur rarely. Reviewing every possible risk has been shown in studies to be confusing for the patient and detrimental to the process of informed consent (2). The level of detail for each of these items is at the discretion of the

practitioner, and there are few guidelines. After providing this information, the practitioner is responsible for making sure the patient understands what was discussed. One popular way of doing this is to have the patient repeat back what was discussed in their own words so that any confusion can be identified and readdressed by the physician. Occasionally at this time the patient may ask for the physician's opinion. According to the enhanced autonomy principal commonly used in modern medicine, any decision should be jointly discussed with the patient who understands the information, and with a person who has medical knowledge (such as a physician). It is appropriate that advice be provided when it is asked for. After the information is discussed clearly, the physician must ensure that the patient or surrogate gives permission (3). Lastly, there should be careful and complete documentation of what was discussed and ultimately decided upon.

Determining capacity is equally as important as obtaining informed consent. In the strictest of definitions, incompetency is a legal term that can only be determined by the legal system. Incapacity to make an informed decision is a better term. Incapacity is a dynamic position, which can change with a patient's changing condition, and only applies to each individual decision. To have capacity, a patient must be able to understand and verbalize understanding of a procedure, appreciate the situation, and to process the information rationally with respect to their own beliefs and values. However, they do not have to be legally 'competent' (4). As an example, if a patient can process the information as described above, but cannot perform their activities of daily living, they have the capacity to make a decision involving their care regardless of their status through the legal system.

If a patient is deemed to not have capacity to make a decision about their care, they should be regularly reevaluated for the ability to do so. If a patient's condition waxes and wanes, they may have capacity one day, but not the next. While Alzheimer's is rare in the obstetric population, the process of assessing capacity and addressing

consent is no different than any other patient. While the patient presented in this case may have seemed complicated, she clearly demonstrated that she had the capacity to make her own medical decisions concerning her epidural placement.

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## 2. On Heart Failure: It's More Than Just Salt

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Heart failure is a serious, complex and often times irreversible medical disease common in America. At its core, heart failure is the inability of the heart to successfully pump blood to meet the hemodynamic demands of the organs and tissues in the body. It is responsible for more admissions and readmissions into the hospital than every single cancer combined. And despite healthcare's increased efforts, readmissions remain high. Medical care for heart failure has many approach considerations including non-pharmacologic methods, such as dietary and fluid restrictions, pharmacologic methods that can be managed at home like diuretics, beta-blockers, anticoagulants, digoxin and intravenous milrinone, as well as invasive procedures such as an implantable cardioverter-defibrillator (ICD). In the most serious, critically ill patients, an intra-aortic balloon pump (IABP) may be put into place until a heart transplant or a left-ventricular assist device (LVAD) can be implanted surgically. Despite all of our healthcare team's efforts and extensive research, heart failure patients continue to be readmitted to the hospital with acute decompensated heart failure.

Heart failure patients often present to the hospital with acute fluid-overload, pulmonary edema, extensive pitting edema, shortness of breath as well as generally feeling fatigued and unwell. Quite

frequently these patients are admitted to ICU for close hemodynamic monitoring, airway management with oxygen by both non-invasive and invasive measures (nasal cannula, CPAP/BIPAP, ventilator), intravenous medications such as inotropic agents, vasodilators, and calcium channel blockers and aggressive diuresis. Doctors are quick to order sodium restrictions but that usually is the end of the road for dietary modifications. Non-compliance of medications and poor diet regimens are often to blame for these readmissions.

It can be challenging to medically manage heart failure patients that do not follow physician as well as the American Heart Association's guidelines. Patients and patient's families may sneak in food and drinks that are unfavorable to their treatment. This can be both frustrating and understandable for the healthcare provider. The diet and fluid restrictions these patients must adhere to can be tough, yet it is important to understand the reality of their disease and the consequences of every single decision. Trying to have the patient see the severity of their disease is another story. It is difficult to imagine not being able to enjoy Thanksgiving turkey with family, hot dogs and chips at summer barbeques, unlimited water whenever thirsty or adding a dash of salt to a bland meal. People love to eat; it's in our genetic make-up. We grow up smelling moms chocolate chip cookies when we've had a terrible day, grandma's gravy, fish on Hanukkah, ham on Christmas, chicken noodle soup when you're sick, a meal with celebrations and a meal with funerals. A comfort meal is just that, comforting. Birthdays come with birthday cake as Easter comes with chocolate eggs. Food has so many different meanings to so

many different people it may be difficult for healthcare providers to stress its importance and its major contribution to health and wellness.

With that in mind, doctors and other healthcare providers need to find a way to effectively communicate the importance of diet and potential fluid restrictions at the very beginning of a diagnosis of heart failure. Little attention has been given to the adherence and significance of diet restrictions. In fact there are limited studies involving strict dietary adherence in the heart failure patient. Most research is geared toward the best pharmacological drugs and implanted devices. Americans may be missing the boat when it comes to diet restrictions. We as providers have given so much attention to salt we are forgetting his sweet saccharine sister, sugar. Current research is discovering sugar plays an even bigger role in chronic heart disease than originally given credit.

Sugar has been directly linked to high levels of obesity, diabetes and even heart problems. Recent studies have deemed high sugar levels a culprit of poor health and state a soda a day increases the risk of coronary heart disease by as much as 30% as well as blaming elevated blood glucose levels to an increase in mortality in acute heart failure.<sup>1</sup> Although more research is needed, diet plays a huge part in health and wellness and studying the effects of salt and sugar should not be overlooked. Strict changes in diet should be considered as an adjunct treatment for heart failure patients. We are well into 2015 and as professionals we should not be too embarrassed to admit a lot of our major health problems may stem from our waistlines.

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