Fellow in Training Research Abstracts Oral Competition

Indiana-ACC Poster Competition Abstract

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Please structure your clinical research abstract using the following headings: * Background * Objective * Methods * Results (if relevant) * Conclusion
Please structure your case study abstract using the following headings: * Introduction/objective * Case presentation * Discussion * Conclusion

Title:

Multi-Disciplinary Team Approach to Cardiogenic Shock Reduces In-Hospital Mortality

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Purpose: To determine the effectiveness of a hospital-wide process improvement program labeled as level 1 cardiogenic shock rapid response that enables a concerted coordinated multi-disciplinary team approach to treatment of patients with cardiogenic shock.

Methods: Conducted a retrospective analysis of the cardiogenic shock rapid response program (protocol group) comparing to similar cohort of cardiogenic shock patients who did not utilize the shock response program. The program required alerting the advanced heart failure trained cardiologist who advises activation of a burst page to the cardiogenic shock team. This team rapidly institutes protocol-directed therapy and use of advanced support devices if necessary. The primary endpoint was hospital mortality. Secondary endpoint was utilization of advanced therapy (temporary mechanical circulatory support)

Results: 471 patients were in the control and 110 in the protocol group. Baseline characteristics were similar and etiology of cardiogenic shock. The protocol group had significant reductions in-hospital mortality (35% to 45% ($p < 0.05$). The utilization of advanced mechanical support was also higher within the protocol group (27% to 13%).

Conclusions: The activation of a coordinated rapid response team and initiation of early goal-directed therapy was associated with improved survival possibly reflecting appropriate and early utilization of advanced mechanical circulatory therapy.

Indiana-ACC Poster Competition Abstract

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Global Right Ventricular Strain is an Independent Predictor of Cardiovascular Events

Upasana Jarori MD, Deborah Green-Hess RCS, Harvey Feigenbaum MD, Stephen Sawada MD

Strategic Research Initiative of Indiana University School of Medicine, Krannert Institute of Cardiology, IU Health

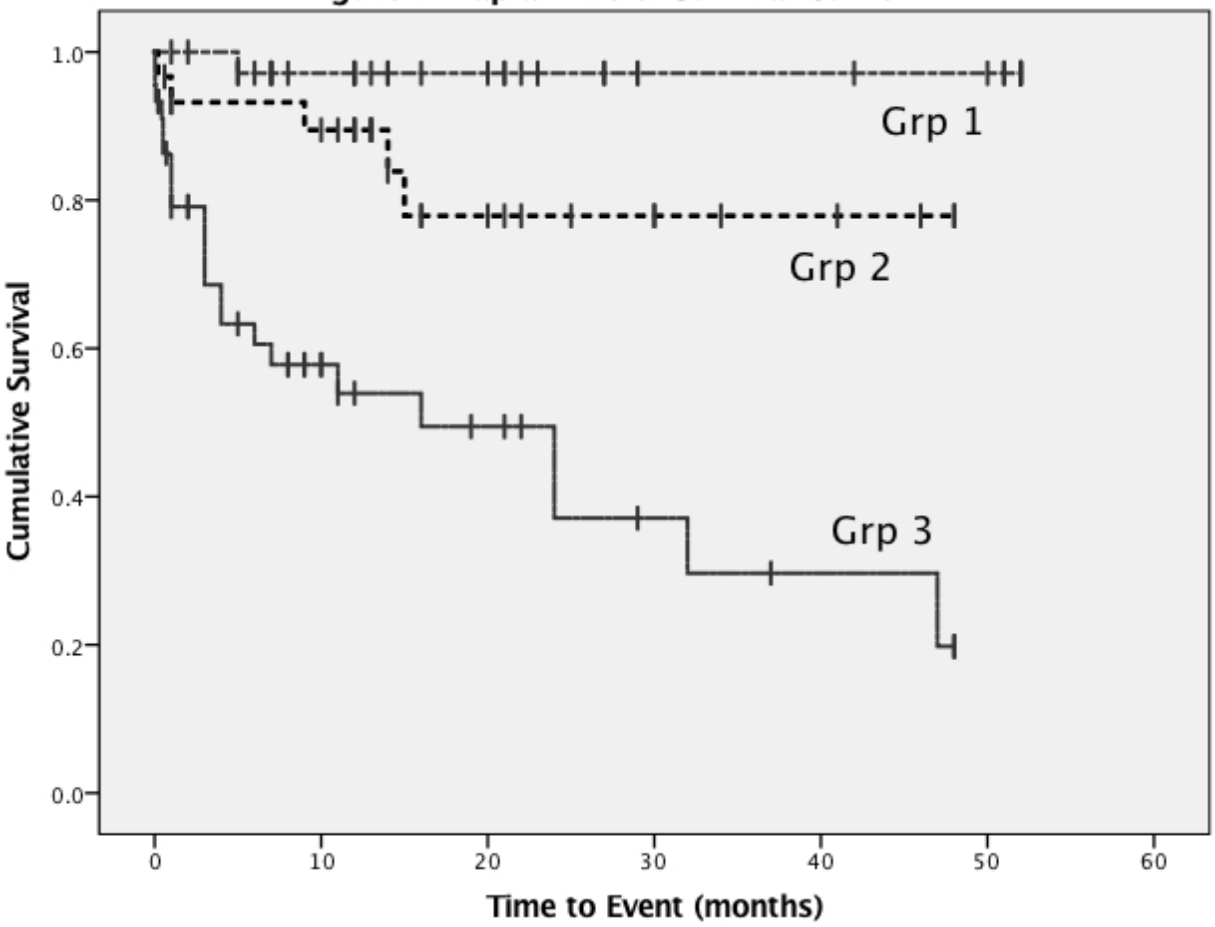
Background: Previous studies have shown the prognostic value of right ventricular (RV) strain assessed by 2D speckle tracking, however evaluation is limited to one apical view. This study evaluated the prognostic value of global RV strain acquired from multiple views.

Methods: GE Vivid echocardiographs were used to acquire images in 3 views of the RV; apical 4 chamber (4C) view, medially angulated long axis (LAX) view and short axis (SAX) view at the aortic valve level in 112 subjects (mean age 57 yrs, 63 % Men). 2D strain was processed using a semi-automated software program. The average value for each of the 3 views was derived (4C and LAX with 6 segments, SAX with 4 segments) and global strain was calculated as the weighted average for each subject. Based on normal values of RV strain (-21.34 $\pm$ 3.08) previously obtained from a control population, subjects were assigned to 3 groups (Grp 1, normal RV function = strain within 2 sd of controls), (Grp 2, moderately reduced = between 2sd and 3sd below controls), (Grp 3, severely reduced $\geq$ 3sd below controls). Subjects were followed for cardiovascular events.

Results: Over a mean follow-up of 17 $\pm$ 16 mos, events occurred in 3% (1/37) of Grp1, 17% (5/30) of Grp 2, and 51% (23/45) of Grp3. Cox regression showed that ejection fraction ($p = 0.011$), history of coronary artery disease ($p = 0.001$), hypertension ($p = 0.009$), type II diabetes mellitus ($p = 0.008$) and RV strain ($p < 0.001$) were significant univariate predictors of events. Age and gender were not predictors. On subsequent multivariate analysis, RV strain emerged as the sole independent predictor of events ($p < 0.001$). Kaplan-Meier analysis (see figure 1) with pairwise log rank comparisons showed better event free survival for Grp 1 vs 2 ($p=0.046$), Grp 1 vs Grp 3 ($p < 0.001$), and Grp 2 vs Grp 3 ($p = 0.002$). RV strain had an area under the curve of 0.812 (CI: 0.723 – 0.901) on ROC analysis with optimal cutoff value of -12 %.

Conclusion: Global RV strain derived from multiple views is an independent predictor of cardiac events and effectively risk stratifies subjects with various levels of RV systolic function.

Figure 1: Kaplan-Meier Survival Curve



Fellow in Training Research Abstracts

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Title:

Combination of Mesenchymal and c-kit+ Cardiac Stem Cells as Regenerative Therapy for Heart Failure: Rationale and Design of the CONCERT-HF Trial of the Cardiovascular Cell Therapy Research Network of the National Heart, Lung, and Blood Institute.

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Background: Approximately 6 million people in the US are living with heart failure (HF) and unfortunately half will die within 5 years of the diagnosis despite best medical management. Adult stem cell therapy has been tested in multiple clinical trials however to date none have tested combinations of cells that may have synergsitic effects in promoting myocardial recovery. Numerous preclinical studies from many independent labs have documented the ability of c-kit+ cardiac stem cells in combination with mesenchymal stem cells to improve heart function and remodeling in a variety of animal models of ischemic cardiomyopathy (ICM).

Objectives: To assess feasibility, safety, and efficacy of autologous bone marrow-derived mesenchymal stem cells (MSCs) and autologous c-kit+ cardiac stem cells (CSCs), alone or in combination, administered by transendocardial injection in subjects with ischemic heart failure.

Methods: In this Phase II multi-center, doublé blinded trial144 patients with ICM will be randomized to one of four treatment groups: Combination (150 million autologous MSCs plus 5 million autologous CSCs), MSCs alone (150 million MSCs), CSCs alone (5 million CSCs), and placebo (cell-free PlasmaLyte-A médium). All study products will be injected transendocardially via the NOGA® XP Mapping and Navigation System into the ischemic border zone and the adjacent scarred tissue of the left ventricle. All subjects will undergo bone marrow aspiration for isolation of MSCs and right heart catheterization, including right ventricle endomyocardial biopsy for isolation of CSCs, will be performed only for the CSC groups. Subjects receive study product approximately 14 weeks after harvest procedures and are followed at day 1, week 1, and months 1, 3, 6, and 12 post-injections to assess safety and efficacy.

Safety endpoints will include major adverse cardiac events (MACE) consisting of death, hospitalization for worsening heart failure (HF), and exacerbation of HF (non-hospitalization). Other significant clinical events including such as non-fatal stroke; non-fatal MI; coronary artery revascularization; ventricular tachycardia/fibrillation; and/or pericardial tamponade will be tabulated and compared between treatment groups.

Efficacy endpoints will include myocardial evaluations by cardiac MRI that will quantify LV function (change in LVEF; and global/regional strain),Structure (change in LVEDVI; LVESVI; and Sphericity Index),Morphology (change in infarct/scar volume (DEMRI). In adddition functional capacity over time will be assessed by change in VO2 max (treadmill); exercise tolerance (6MWT); and the Minnesota Living with Heart Failure Questionnaire (subject reported). The incidence of major adverse cardiac events (MACE); and cumulative days alive and out of hospital will be tabulated. Changes in HF biomarkers (N-terminal pro b-type natriuretic peptide) will be quantified. All endpoints will be analyzed by treatment group between baseline and 6 and12 months.

Conclusions: CONCERT-HF is the first trial to assess c-kit+ CSCs alone and in combination with autologous bone marrow MSCs in improving left ventricular function in patients with ICM. The results of this novel study will have a significant impact in the field of cell therapy for cardiac disease.

Indiana-ACC Poster Competition Abstract

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Case Abstracts

Indiana-ACC Poster Competition Abstract

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Title:

Interaction between Centrifugal Flow Left Ventricular Assist Device and Subcutaneous Implantable Cardioverter Defibrillator

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Introduction

Subcutaneous implantable cardioverter-defibrillators (S-ICD) have emerged as an attractive option for patients at risk of sudden cardiac death with no bradycardia pacing indications. However, there is a lack of data on the safety and efficacy of S-ICD therapy in the left ventricular assist device (LVAD) population as combined use of the two devices creates a milieu for device-device interactions. The implications of interactions between S-ICDs and LVADs remain controversial with sparse but conflicting reports on the safety regarding the combined use of these devices. We report a case of electromagnetic interference (EMI) noted on routine device interrogation of an S-ICD post LVAD implantation.

Case presentation

A 25-year-old man with past medical history of non-ischemic dilated cardiomyopathy and severe persistent left ventricular dysfunction underwent an S-ICD (Boston Scientific EMBLEM) implantation for primary prevention of sudden cardiac death (SCD). The patient's vectors were tested post implantation and all 3 were within normal parameters (Figure 1). Almost 1 year after S-ICD implantation, he developed intractable acute LV failure and underwent urgent placement of a left ventricular assist device (HeartWare, Inc, Framingham, MA, USA) The patient's hemodynamic status stabilized, and he was listed for transplant. Interrogation of the S-ICD following the LVAD revealed failure of the device to sense appropriate ventricular activity in all 3 vectors. Though sinus rhythm can clearly be seen in both primary and secondary vectors, the S-ICD regarded this as "noise" (Figure 2). Upon switching to the alternate vector, sinus rhythm was detectable but frequently under-sensed by the S-ICD (Figure 2).

Discussion

There is paucity data on the long-term efficacy and safety of S-ICDs when utilized among patients with LVADs. The present case demonstrates a serious EMI between LVAD and S-ICD. Continuous flow LVADs are the most commonly used LVADs in contemporary clinical practice. With expanding use of S-ICDs, the electromagnetic interaction between S-ICD and CF-LVADs is likely to become a more frequently encountered occurrence. A likely mechanism for the sensing interference caused by EMI likely lies in the algorithm used by S-ICDs in tracking rhythms. Unlike traditional transvenous ICDs, S-ICDs do not provide bradycardia pacing and are hence not required to classify each individual electrogram. Based on these design constraints for sensing and rhythm detection, S-ICDs operate by tracking the number of transitions (signal deflections that cross isoelectric baseline) in a fixed time interval or "sensing window." The device classifies signals as noise if they exceed the algorithm's threshold and labels the most prominent signal within the sensing window with the label N (Figure 3). In contrast to readily visible EMI in intracardiac defibrillators, electromagnetic interaction between the S-ICD and LVAD is not readily visible during standard device interrogation; however, these signals can be identified using a high resolution capture setting. Under this setting, the EMI is readily visible (Figure 4). Regarding the alternate vector (tip to ring electrode), the S-ICD is able to detect sinus rhythm likely due to a reduction of EMI given the relative anatomic isolation of both the ring and tip electrodes from the LVAD in contrast to the primary and secondary vectors which both involve the pulse generator as part of their vectors. Unfortunately, the alternate vector signal quality is often poor in many patients including ours – causing the device to undersense the patient's underlying sinus rhythm. Regardless of etiology, the inability of the device to detect either sinus rhythm effectively or act appropriately upon potential ventricular arrhythmias due to sensing interference is cause for concern in this high risk patient population and raises several questions with potential answers (discussed further in full text).

Conclusion

While this patient and many like him undergo LVAD implantation without any incidence of VT, the majority of patients with LVADs require ICDs due to the ventricular arrhythmias either present prior to implantation or those which develop afterward. Though the interaction between intracardiac defibrillators and LVADs is well described in the literature, there is limited data regarding the interaction between S-ICDs and LVADs. To that end, we present this case to not only illustrate a scenario expected to be encountered by many multidisciplinary teams in the management of advanced heart failure patients but also to elucidate some of the underlying mechanisms involved in order to further future troubleshooting solutions.

Indiana-ACC Poster Competition Abstract

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Title:

Percutaneous Melody valve insertion during a twin pregnancy.

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Summary : A 20 year old female born with a double outlet right ventricle, transposition of great arteries and pulmonary valve stenosis underwent a Rastelli procedure in childhood. She then presented with symptoms of dyspnea while she was 6 weeks pregnant with twins due to right ventricle to pulmonary artery conduit degeneration.

History : An unplanned pregnancy and symptoms of exertional dyspnea led this 20 year old female patient, in her 6th week of gestation to seek care. Her vital signs were stable and cardiac examination revealed a normal S1, widely split S2 with a III/VI systolic ejection murmur loudest at the left upper sternal border.

Angiography/Diagnostic tests : An echocardiogram showed a peak gradient of 55-60mmHg across her RV-PA conduit with mildly reduced right ventricular function, mild right ventricular dilation and hypertrophy. Left ventricular function was only borderline diminished. Since her hemodynamics would worsen as her pregnancy progressed it was felt that it would be appropriate to intervene earlier, to allow her to safely carry the twins to term and deliver. Therefore, at 13 weeks gestation the patient underwent cardiac catheterization. Baseline right ventricular systolic pressure was 70/18/35mmHg.

Procedure : Using a 12F sheath and an Amplatz super stiff wire in the left pulmonary artery,angioplasty of the conduit was performed using 20x4 and 22x4 Atlas Gold balloons. There was no appreciable drop in gradients with angioplasty. Since there was also a gradient at the level of the inflow conduit it was decided to stent the conduit first and then deploy the Melody valve. We then upgraded to an 18F sheath and using a 14F Mullins trans-septal sheath in the main PA, deployed 3 Palmaz stents in the proximal conduit. Then, using a 22-mm Ensemble balloon delivery system, the Melody valve was deployed in its final location. Final angiography demonstrated no pulmonic insufficiency with right ventricular hemodynamic parameters of 44/8/20mmHg.

Conclusion : More women with congenital heart disease are reaching child-bearing age. Optimizing their hemodynamic status prior to pregnancy reduces the risk to the patient and the fetus. Since surgery is associated with high risk during pregnancy, this is where an appropriately timed percutaneous approach can help. In our case, the patient went into labor at 32 weeks and delivered one healthy baby. One fetus unfortunately had intrauterine fetal demise for unknown reasons.

Indiana-ACC Poster Competition Abstract

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Title:

EGPA Mediated Eosinophilic Myocarditis with Initial Normal Eosinophil Count with Rapid Progressive Decrease in Cardiac Function

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Introduction: Delay in diagnosis of eosinophilic myocarditis can lead to high risk of morbidity and mortality. Eosinophilia is one of the first features in a newly diagnosed heart failure to suggest eosinophilic etiology. When a patient initially presents with normal eosinophils, the diagnosis can be delayed.

Case Presentation: A 37 year old female with a distant history of sinusitis and asthma presents with nausea, vomiting, fever and new diffuse rash. Initial presentation was concerning for septic shock with a normal eosinophilia though she soon developed dyspnea, edema, and abdominal distention with a new eosinophilia. Initial echocardiogram demonstrated a left ventricular ejection fraction of 40-45%. She quickly developed cardiogenic shock and required dobutamine and subsequent echocardiogram two days after the first demonstrated a decrease in ejection fraction to 20-25% with a new tricuspid valve thrombosis with CT chest imaging with multiple acute pulmonary emboli. MRI demonstrated subtle subepicardial to epicardial delayed hyperenhancement involving the basal to mid inferior segments with extension into the basal inferolateral segment, a pattern non-ischemic and most suggestive of myocarditis.She was diagnosed with eosinophilic granulomatosis with polyangiitis (EGPA) and was started on intravenous corticosteroids, cyclophosphamide, and rituximab with fall in the eosinophilia. She was quickly weaned off dobutamine and within two weeks had return to normal ventricular function.

Discussion: EGPA is a major vasculitis identified by asthma, sinusitis, eosinophilia, and systemic vasculitis in two or more extrapulmonary organs. There is a high prevalence for cardiac involvement in EGPA and in its most severe can cause eosinophilic endomyocarditis. When a patient presents with noncardiac symptoms and normal eosinophils, diagnosis can be delayed. In this case, the patient quickly decompensated to cardiogenic shock and venous thromboembolism with concomitant presenting eosinophilia suggesting eosinophilic etiology. With treatment for EGPA with corticosteroids, rituximab, and cyclophosamide, left ventricular function improved in two weeks.

Conclusion: Eosinophilic myocarditis can progress and decompensate quickly with poor prognosis. Early recognition of eosinophilic myocarditis can lead to appropriate therapy with potential quick reversal of left ventricular function.

Indiana-ACC Poster Competition Abstract

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Title:

MitraClip as salvage treatment for cardiogenic shock from acute mitral regurgitation complicating myocardial infarction.

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Introduction/objective

Transcatheter mitral valve repair (TMVR) is a percutaneous treatment that is available for patients with symptomatic primary mitral regurgitation (MR) who have prohibitive risk for surgical repair. We present a case of a patient with myocardial infarction resulting in cardiogenic shock and refractory heart failure secondary to severe mitral regurgitation who was deemed prohibitive risk for surgery and underwent successful salvage therapy with TMVR (MitraClip).

Case presentation

A 70 year old male with history of prior CVA with mild memory loss with baseline NYHA class I functional status presented to an outside facility with acute chest pain and hypotension secondary to inferior STEMI and cardiogenic shock requiring norepinephrine. The patient underwent emergent LHC that showed a dominant left circumflex with severe stenosis at a trifurcation lesion involving the mid left circumflex, OM2 and OM3. The patient underwent successful DES placement to mid left circumflex into OM3 with POBA of OM2. Post procedural echocardiogram showed mild LV dilation, LVEF 45% with severe mitral regurgitation as well as severe pulmonary hypertension with RVSP estimated above 74 mmHg. The mitral regurgitation was felt to be secondary to both dilation of the left ventricle (malcoaptation of the MV leaflets) as well as posterior papillary muscle dysfunction from the MI.

The patient had a protracted hospital course over the following 30 days with multiple readmissions for CHF and cardiogenic shock resulting in multi-organ dysfunction including oliguric renal failure requiring CVVH, respiratory failure requiring BIPAP and congestive hepatopathy. The patient was deemed prohibitive risk for surgical MVR (estimated risk of morbidity or mortality ~80% by STS calculation) in his present condition and palliative care was consulted for goals of care discussions and hospice consideration. The patient and family desired aggressive measures and he was ultimately transferred to our facility for further evaluation.

Upon transfer the patient was dependent on dobutamine and CVVH with continued requirement of intermittent BIPAP for refractory pulmonary edema. A repeat echocardiogram showed persistent severe MR and progression to severely reduced LV function. He was considered for MitraClip procedure as salvage therapy for refractory cardiogenic shock. He ultimately underwent TMVR with two MitraClips deployed along A2-P2 resulting in mild residual MR (with normalization of pulmonary vein flow) and mild mitral stenosis with a mean gradient through the mitral valve of 5 mmHg at a heart rate of 105 bpm.

Following the procedure, the patient was weaned off dobutamine in four days. Due to improvement in hemodynamics he tolerated transition from CVVH to intermittent HD within six days of the procedure. His renal function had recovered and the patient did not require iHD within ten days following TMVR. Medical therapy for his heart failure was initiated and tolerated with plan to transfer to acute rehabilitation facility for aggressive physical therapy. It remains to be seen if the patient will require surgical intervention and if his functional status and comorbities will improve to the point that this will be a reasonable option.

Discussion

TMVR therapy is based on the surgical Alfieri edge-to-edge repair. By the 2017 AHA/ACC updated guidelines for management of patients with valvular heart disease, TMVR may be considered for severely symptomatic patients (NYHA class III to IV) with chronic severe primary MR (stage D) who have favorable anatomy for the repair procedure and a reasonable life expectancy but who have a prohibitive surgical risk because of severe comorbidities and remain severely symptomatic despite optimal GDMT for heart failure. The role of TMVR for patients with acute secondary or functional mitral regurgitation who were excluded from large randomized trials remains unclear. However, TMVR may be considered for salvage therapy in acute MR and cardiogenic shock in patients who may later become surgical candidates with further stabilization and rehabilitation.

Conclusion

TMVR is an available option for refractory heart failure and cardiogenic shock from acute severe mitral regurgitation complicating myocardial infarction in patients who are deemed risk prohibitive for surgery.

Indiana-ACC Poster Competition Abstract

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Title:

Rare Case of Left Ventricular Outflow Obstruction from Metastatic Liposarcoma

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Introduction: We present a rare case of metastatic liposarcoma to the left ventricular endocardium causing left ventricular outflow track obstruction.

Case Presentation: 69 year old black male diagnosed with metastatic liposarcoma involving the retroperitoneum, left psoas muscle, pulmonary bronchus, and biopsy proven lytic bone lesions presented to the hospital with acute renal failure, hyperkalemia, and metabolic acidosis. During his hospitalization, he developed atrial fibrillation with rapid ventricular rate and an echocardiogram was ordered as part of the work up.

Echocardiogram showed a 4 cm x 2 cm homogenous appearing mass at the basal anterior septum (figure 1) of the left ventricle. The mass appeared to be originating from the endocardium of the base of the septum; however, it is difficult to assess the exact origin. The mass was almost obstructing the left ventricular outflow tract. The continuous wave Doppler across the aortic valve was more than 4 meters per seconds (figure 2) with peak gradient of 80mmHg. The mass was prolapsing through the aortic valve in systole causing obstruction in systole (figure 3). On exam he had grade III/VI ejection systolic murmur best heard at LUSB. Given the rapid progression of disease, Oncology planned to start inpatient chemotherapy with trabectedin 1.5 mg/m2. He is currently inhouse awaiting his first dose.

Discussion: Metastatic cardiac tumors are uncommon in clinical practice but are reported in up to 14% of autopsy studies (Bussani 2007). The most common metastatic tumors to the heart include lung cancer, melanoma, mesothelioma, undifferentiated carcinoma, and breast carcinoma. The pathways of metastasizing to the heart include direct extension, hematongenous dissemination, lymphatic spread, or intracavitary diffusion from the inferior vena cava or pulmonary veins. Clinical presentation of cardiac involvement is variable and depends on the site of metastasis, but can including pericardial tamponade, arrhythmia, systemic or venous embolism, conductive defect, heart failure, myocardial infarction, or pericardial constriction (Bussani 2007).

The endocardium is the least affected site of metastasis (5%) compared to the pericardium (69%) and myocardium (32%). Endocardial metastases mainly affect the right-sided cardiac structures, in part due to the slower flow and lower contractility compared to the left-side of the heart. Moreover, endocardial
metastases are thought to result from hematogenous attachment, thus passing through the right-sided structures first (Bussani 2007).

Liposarcoma is a common type of all sarcomatous tumors and demonstrates a range metastatic potential depending on the subtype, with low metastatic potential in well-differentiated/dedifferentiated tumors and high metastatic potential in myxoid/round cell and pleomorphic tumors. Liposarcoma with cardiac metastasis is rare and mostly described in case reports. Liposarcoma can metastasize to any cardiac chamber (Mettahedi 2013, Pino 2013, Ribeiro 2011, Chughtai 2007), as well as cause invasion from the inferior vena cava into the right atrium (Vajtai 2014) or from the pulmonary vein into the left atrium (Baubion 1985).

Conclusion: Our case is unusual as the patient had a dedifferentiate subtype with highly metastatic phenotype. He had metastases involving multiple organ systems, including muscle, heart, lung, and bone. His cardiac metastasis was in the left ventricle presumably attached to the endocardium of the basal septum and causing LVOT obstruction in systole. The prognosis in these individuals is regrettably poor.

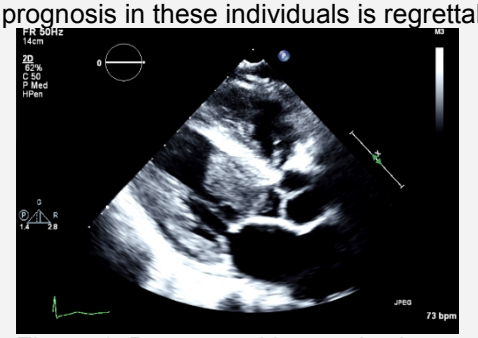

Figure 1: Parasternal long axis view during diastole showing a homogenous appearing mass at the base of the anterior septum.

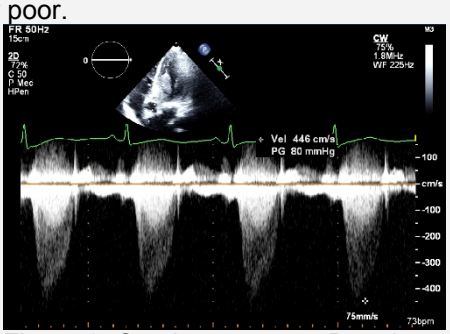

Figure 2: Continuous wave Doppler across the aortic showing a peak velocity of 4 meters per second and peak gradient of about 80 mmHg.

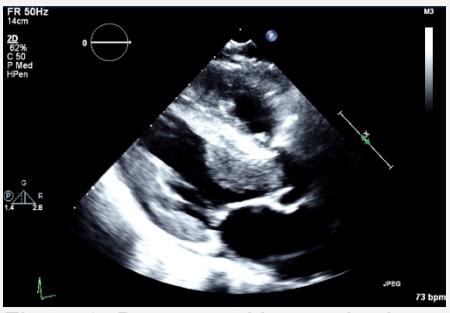

Figure 3: Parasternal long axis view during systole showing the mass prolapsing through the aortic valve.

Indiana-ACC Poster Competition Abstract

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Please structure your case study abstract using the following headings: * Introduction/objective * Case presentation * Discussion * Conclusion

Title:

Azotemia as an Indicator of Bilateral Renal Artery Stenosis after Acute Coronary Syndrome

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Introduction/Objective: Atherosclerotic renal artery stenosis (RAS) is prevalent in patients with cardiovascular disease (CVD). Recognition, diagnosis and proper management is necessary to mitigate progression and control potential renal and systemic effects. This case highlights the necessity of awareness of bilateral RAS as an etiology for azotemia and hypotension after initiation of an angiotensin-converting-enzyme inhibitor (ACEi).

Case Presentation:

53-year-old Caucasian male with history of remote tobacco abuse and recent drug eluting stent placement to his left circumflex 8 days prior for acute coronary syndrome re-presented with complaints of lightheadedness and fatigue. During his previous hospitalization, he was found to have hypertension with blood pressures in the 200s systolic and was subsequently initiated on carvedilol 6.25mg BID and lisinopril10mg daily in addition to dual antiplatelet therapy. His ejection fraction was 45% by LV gram with mild inferior hypokinesis and he was discharged after 48 hours of an uncomplicated course with all laboratory values within normal limits.

He presented to a post hospital follow up with complaints of an episode of lightheadedness while driving and overall fatigue for the last 4-5 days. His blood pressure was 109/81 at the appointment. Evaluation with lab tests was planned and while in the outpatient lab, patient got lightheaded, diaphoretic with tunnel vision and had a syncopal episode lasting 45 seconds. He was brought to the emergency room asymptomatic with blood pressure of 80s/50s which improved with 2 L of IV boluses to 110s/60s. The patient denied any complaints and was insistent that his medications were too high. Patient's lab values revealed acute kidney injury (AKI) with creatinine (Cr) of 2.02mg/dL, blood urea nitrogen (BUN) of 44mg/dL and potassium (K) of 6mmol/L.

Initial concern for contrast induced nephropathy, hypotension/medication induced AKI and concern for RAS prompted withdrawal of ACEi and patient was admitted for observation with renal artery doppler ultrasound (RADUS). RADUS revealed bilateral ostial peak systolic velocity (PSV) greater than 240cm/sec highly suggestive of bilateral RAS. His Cr, BUN and K normalized and blood pressure was 120s/60s in the morning. He was subsequently discharged for follow up with peripheral vascular disease specialist, unfortunately he was unable to go his appointment due to insurance issues and he has had several calls to cardiologist for 'high blood pressure'. Patient is planned to complete computed tomography angiography (CTA) of his renal arteries at follow up.

Discussion:

Atherosclerotic RAS is prevalent in patients with CVD affecting 8-20% of patients with coronary arterial disease and up to 60% of patients with peripheral vascular disease. RAS is an increasingly significant cause of end-stage renal disease (ESRD) occurring in 5%-22% of ESRD patients. Patients with resistant hypertension, hypertension diagnosed < 30 or >age 55, azotemia after initiation of ACEi or angiotension receptor blockade (ARB), unexplained flash pulmonary edema or atrophic kidney size or size discrepancy greater than 1.5cm should be evaluated for RAS. RADUS, CTA, magnetic resonance angiography (MRA) and catheter angiography are all modalities to establish the diagnosis of RAS. Patients should be monitored for progression of disease 6 months after diagnosis and then at least annually.

Treatment of RAS is aimed at aggressive risk factor modification and ACEi/ARBs (particularly for unilateral disease). Despite initial thoughts there are few indications for endovascular stenting; indications include RAS with flash pulmonary edema, RAS with resistant hypertension with medication intolerance or small kidney, and RAS with progressive CKD or unstable angina.

Conclusions:

This case highlights the prevalence of atherosclerotic RAS in our CVD patient population and the necessity to remain astute to etiologies of azotemia after initiation of ACEi. Treatment is largely medical with few indications for endovascular intervention.

Indiana-ACC Poster Competition Abstract

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Title:

Severe Re-expansion Pulmonary Edema after cardiac surgery: Management Using Extracorporeal Membrane Oxygenation

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

INTRODUCTION:
Re-expansion Pulmonary Edema (REPE) is a recognized but rare complication of lung re-inflation after pathologic collapse or intentional deflation. The presentation of REPE may be highly variable, ranging from a clinically asymptomatic, incidental radiologic finding to acute respiratory failure accompanied by severe, life-threatening hypoxemia. With the current report, we present a patient with severe aortic insufficiency (AI), severe mitral regurgitation (MR), coronary artery disease (CAD), severe pulmonary hypertension (pHTN), who underwent aortic valve replacement (AVR), mitral valvuloplasty (MVr), coronary artery bypass grafting (CABG), and developed at the immediate post-operative period severe respiratory failure due to REPE, requiring venous-venous Extracorporeal Membrane Oxygenation (VV-ECMO).

CASE PRESENTATION:
A 61 year-old African-American male with known history of AI, MR and CAD, presented with exacerbated acute diastolic left ventricular (LV) dysfunction and symptoms of congestive heart failure (NYHA class 3-4). He was admitted to the cardiology service of our institution for medical optimization. The past medical history was notable for symptomatic premature ventricular complexes status post ablation therapy, systemic and pulmonary hypertension, gastroesophageal reflux disease and transient ischemic attach. A transesophageal echocardiogram (TEE) showed severe AI, moderate MR, mild tricuspid regurgitation, severe left atrial dilation, LV ejection fraction of 55% and wall motion abnormalities (WMA) to the right coronary artery (RCA) territory. A left heart catheterization confirmed a mid-RCA lesion of 50% and an apical, distal left anterior descending (LAD) lesion of 90%. The patient underwent a right heart catheterization which showed severe pulmonary HTN, which was reversible with provocative vasodilatory test and a pulmonary artery pressure of 63/25 mmHg. His heart failure exacerbation was optimized with diuretic and antihypertensive therapy and he was discharged home one week prior to the operation. The patient was presented the day of the scheduled operation and he underwent AVR with a bioprosthetic valve, MVr with a ring annuloplasty, and CABG with a vein graft from the ascending aorta to mid-RCA. Bilateral moderate amount pleural effusions were drained at the end of the case. The total fluid administration by anesthesia was 2 liters of crystalloid and colloid solutions and no blood products. A post-operative TEE revealed no prosthetic valve dysfunction or paravalvular leak, trivial MR, no WMA and preserved LV ejection function. His pHTN improved with pulmonary artery pressure of 37/18 mmHg. The patient soon after arrival in cardiovascular surgery ICU developed elevated peak airway pressures (70 cm H_2O) and progressive hypoxemia (arterial oxygen saturation 82% to 88%; arterial oxygen tensions 68 mmHg on 100% FiO2), along with copious quantities of straw-colored, foamy fluid in the endotracheal tube and ventilator tubing. Hand-bag ventilation verified the presence of substantially reduced lung compliance. A chest radiograph confirmed a bilateral pulmonary edema and hypoxemia became more severe during suctioning. Fiberoptic bronchoscopy revealed fluid arising from both main airways, and another TEE was performed and was unchanged from the operating room. The patient was treated with intravenous furosemide without a beneficial effect. He was started on inhaled nitric oxide (iNO) as a pHTN crisis was considered, but did not provide any clinical improvement. In the setting of non-cardiogenic flourish pulmonary edema decision was made to place the patient on venous-venous ECMO support for acute respiratory failure. Over the next 12 hours a progressive reduction in the amount of pulmonary edema fluid was observed concomitant with a steady improvement in the patient's respiratory status. He was weaned from the inotropic and vasoactive support and VV-ECMO was gradually weaned and discontinued on post-operative day (POD) 3. The patient was slowly weaned from mechanical ventilation on POD 5 and the remainder of his hospital course was uneventful with discharge to home on POD 10 on room air.

DISCUSSION:
To the authors' knowledge, this is a very rare described case of life-threatening REPE after cardiac surgery and cardiopulmonary bypass which was successfully managed with the use of ECMO as a salvage therapy. Early reviews of REPE reported a mortality up to 20%, but more recent data suggest better survival. REPE is most often described in patients with a persistently collapsed lung (pneumothorax, pleural effusion, extrinsic compression by an intrathoracic mass), concomitant with rapid re-expansion of the lung and application of negative pressure to the affected pleural space. Literature review has identified as risk factors of REPE the younger age of the patients (<40 years), lung collapse >7 days, rapid drainage of large pleural effusions (>3 liters). REPE may also occur after relatively brief periods of atelectasis or lung deflation during surgical procedures. The pathophysiology responsible for REPE remain unclear on the current scientific data. The most accepted mechanism in literature has been identified as ischemia-reperfusion injury. Ischemia during deflation and the detrimental influence of neutrophil infiltration and the products of their activation on reperfusion

Indiana-ACC Poster Competition Abstract

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CV TEAM

Abstracts

Indiana-ACC Poster Competition Abstract

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Title:

One Hospital's Path to Develop an IVC Filter Registry/Protocol/Clinic

Abstract: (Your abstract must use Normal style and must fit into the box. You may not alter the size of this)

Background

Inferior Vena Cava (IVC) filters are small cage like devices placed percutaneously into the inferior vena cava to prevent propagation of thrombus into the pulmonary arteries. Currently there are two available types of filters, permanent filters and retrievable filters.

In 2014 the FDA initiated a comprehensive analysis of filter placement and issued a statement recommending implanting physicians and clinicians responsible for the on-going care of patients with retrievable IVC filters consider removing the filter as soon as protection from pulmonary embolism is no longer needed. Prior to the hospital's structured system, there was a low rate of follow up. The hospital had three separate databases involving two different implanting groups. Therefore, Parkview Health felt it was imperative to develop a comprehensive approach to IVC filter placement and follow-up to ensure good patient outcomes and comply with FDA recommendations.

Objective

Develop a single hospital process for following IVC filter patients to ensure proper indication for procedure order, short term, long term follow-up, and outcomes of IVC filters implantation and removal.

Methods

First we had to determine who was ordering the implantation and removal of the filters, who was implanting them and who was following up on the patients. We established a team to combine efforts to ensure IVC filter patients were appropriately managed and monitored.

Results

The team developed a hospital wide IVC filter protocol agreed to by the two implanting physician groups. An IVC filter registry was developed with the use of an EPIC Crystal Report to identify patients receiving and removal of IVC filters. The registry administrator facilitates a follow-up appointment in the newly developed IVC Filter Clinic where an NP or MD will determine if and when removal is appropriate.

Conclusions

The policy and processes implemented will ensure Parkview Health is compliant with the FDA recommendations for IVC Filter insertion and removal and patients will avoid complications with IVC filters being left in longer than appropriate.

Indiana-ACC Poster Competition Abstract

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Training Program:

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Impact of Nurse Scripting on Cognitive Impairment Testing Using the Mini-Cog in Patients Hospitalized for Heart Failure

Vijay U. Rao, Kathy Stark, Deb Lindsey, Kris Roberts, Melissa Kowgitz, Laurie Donnelly, Mary Crawford, Renee Smith, Eiran Z. Gorodeski

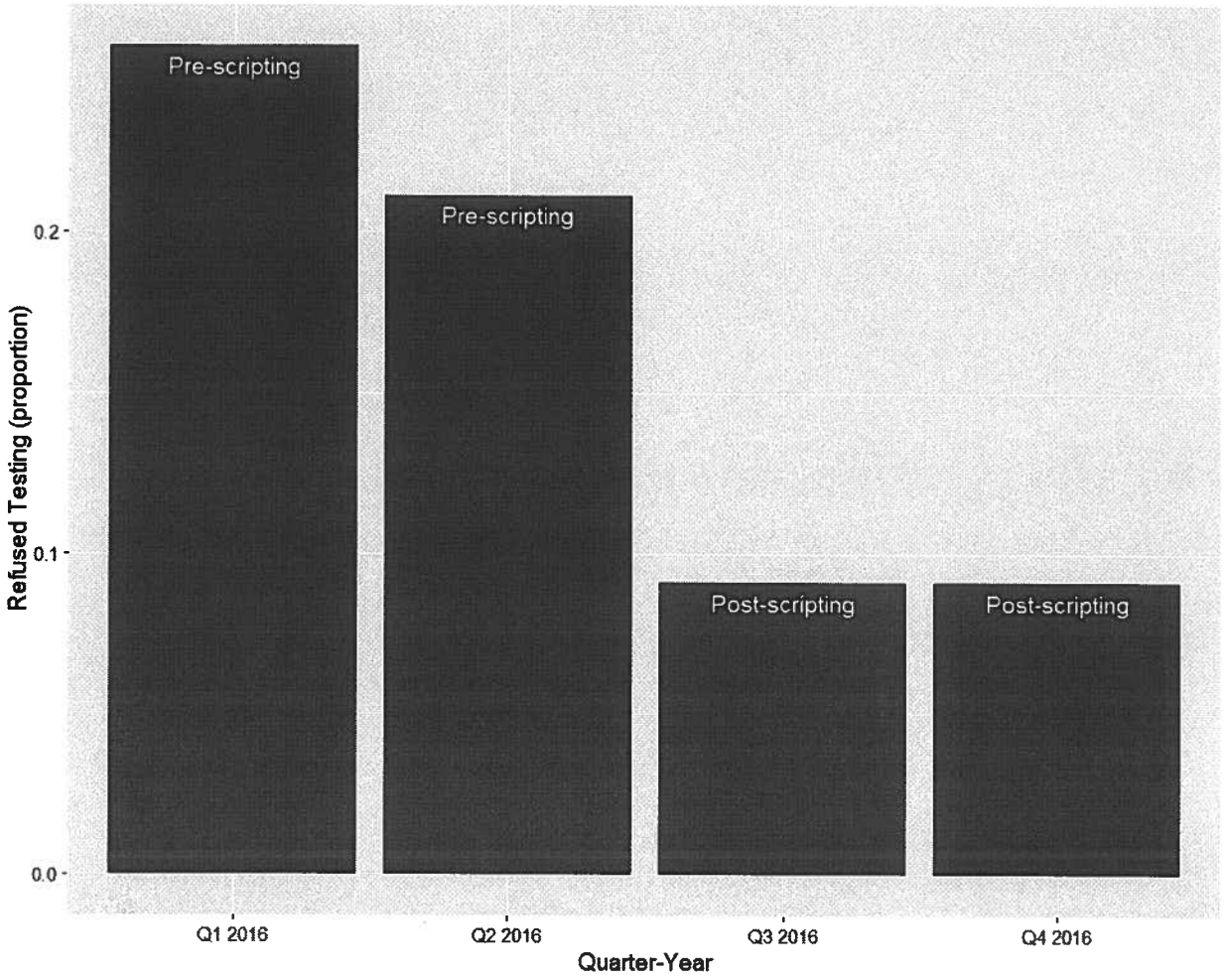
Introduction: Cognitive impairment (CI), as assessed by the Mini-Cog, a simple three-minute word recall and clock draw test, has been shown to be a strong predictor of HF readmissions in patients over the age of 65. In our experience a barrier to completion of the Mini-Cog in the inpatient setting has been a high rate of patient refusal to participate in testing.

Hypothesis: We hypothesized that standardized nurse scripting in introducing CI screening to patients hospitalized for HF would reduce their rate of refusal to participate in testing.

Methods: We collaboratively developed a standardized script for HF nurse navigators (n=4) to introduce the Mini-Cog to older adults hospitalized for HF at Franciscan Health, a community-based hospital in Indianapolis, Indiana, USA. This involved telling the patient at the end of an inpatient care coordination visit, "I have an activity I would like to complete before I leave. This is something we like to do with our patients 65 and older. Can I proceed?" We then documented whether or not the patient agreed to participate.

Results: In the 6 months prior to nurse scripting, 50 of 216 (23%) older adults hospitalized for HF refused to complete the Mini-Cog. After implementation, 19 of 209 (9%) patients refused to complete testing (Z-score 3.9, P<.001) (**Figure**).

Conclusions: A large proportion of older adults hospitalized for HF are hesitant to participate in CI screening as part of care coordination pre-discharge assessment. A standardized script used by nurse navigators to introduce testing is effective in enhancing patient compliance with CI testing.


Pre-scripting
Pre-scripting
Post-scripting
Post-scripting
0.2
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Refused Testing (proportion)
Q1 2016
Q2 2016
Q3 2016
Q4 2016
Quarter-Year