2.3 p<0.05) compared to those with HFrEF (without HIV). **Conclusions:** Results from this single-center study provide insight into the current treatment and management of HFrEF in patients with HIV. This vulnerable population may receive less aggressive GDMT, especially during their first year after HFrEF diagnosis, which could be driving increased hospitalizations. Furthermore, these patients may face additional factors that affect their care, such as chronic kidney disease and racial disparities.

108

Sacubitril-valsartan Improves Blood Pressure And Heart Failure In Left Ventricular Assist Device (lvad) Patients

Kristin Freed, Rachel L. Goldberg, Bonnie Marino, Rebecca Fioretti, Nancy Klemans, Chun Woo Choi, Ahmet Kilic, Roberta Florido, Kavita Sharma, Nisha Gilotra, Steven Hsu; Johns Hopkins Hospital, Baltimore, MD

Purpose: Angiotensin receptor neprilysin inhibitors (ARNIs) are not routinely used in patients following left ventricular assist device (LVAD) implantation. At our center, we have increasingly adopted ARNI use in LVAD patients. The objective of this study was to investigate the effects of ARNI therapy on LVAD patients. **Methods:** Stable LVAD outpatients with hypertension and persistent heart failure in spite of standard LVAD optimization were initiated on ARNI therapy at our center. We retrospectively reviewed medication requirements and clinical parameters pre- and 3-months post-ARNI initiation. **Results:** Twenty-one LVAD outpatients were initiated on sacubitril-valsartan in an effort to improve blood pressure control and heart failure symptoms. Of these 20 patients, 10 (50%) were maintained on 24/26 mg BID dosing, 6 (30%) were uptitrated to 49/51 mg BID, and 4 (20%) to 97/103 mg BID. Three months following ARNI initiation, mean arterial pressure improved from 92±24 to 75±19 mm Hg (P<0.001). ARNI allowed for significant dose reduction in calcium channel blocker dose burden (nifedipine 53±60 to 29±48 mg/day, P=0.02; amlodipine 2±4 to 1±2 mg/day, P=0.06). ARNI also facilitated a significant reduction in loop diuretic requirement (furosemide equivalent of 147±144 to 72±84.7 mg/day, P=0.001). There was an overall improvement in New York Heart Association Functional Class (2.6±0.8 to 1.6±0.7, P<0.001). Renal function did not appreciably change (Creatinine 1.3±0.5 to 1.3±0.3 mg/dl, P=0.68). There was a trend towards reduced left ventricular diastolic diameter (6.1±1.0 to 5.7±1.1 cm, P=0.13). Six patients experienced unremitting side effects requiring ARNI cessation (dizziness/hypotension, 4; LVAD suction, 2; cough, 1). **Conclusion:** ARNI can improve blood pressure, decrease diuretic requirement, and functional capacity in LVAD patients. LVAD speed and medication adjustments may be necessary following ARNI initiation, and in some instances, side effects can limit the ability to sustain ARNI therapy in the setting of LVAD.

109

Novel Risk Stratification Score For Hfpef And Afib: HAD-AFIB

Asad Ghafoor[1], Rachel Pedersen[1], Viviana Zlochiver[1], Michael Peterson[1], Nasir Sulemanjee[1], Vinay Thohan[2], Adam Schuldt[1], Abdul J. Tajik[1]; [1]Aurora St Luke's Medical Center, Milwaukee, WI; [2]Mission Health System, Asheville, NC

Introduction: Atrial fibrillation (AF) is highly prevalent in patients with heart failure with preserved ejection fraction (HFPEF). Both conditions are associated with shared risk factors including older age, hypertension and diastolic dysfunction. Given the significant phenotypical overlap between these diseases, it is difficult to disentangle outcomes. Therefore, a clinical tool for collective risk stratification is needed. **Hypothesis:** We hypothesized that outcomes in patients with concomitant HFPEF and AF can be reliably stratified using a scoring system. To test this hypothesis, we developed HAD-AFIB, a comprehensive risk-stratification score based on risk factors for clinical use. **Methods:** A random sample of 1,205 cases of concomitant HFPEF and AF was selected out of which 803 cases were used for the development of the predictive score and 402 were designated for validation. Using univariate Cox proportional hazards models, risk factors with significant contribution to mortality and heart failure (HF) hospitalization were identified. Forward stepwise selection along with clinical input was then used to identify multivariable models. Independent predictors for mortality and HF hospitalization were assigned scores based on hazard ratios. The score was then calculated and tested for association and fit in the validation cohort. **Results:** Based on multivariate analyses, Hypertension, Age, Diastolic Dysfunction, Admission for HF, Filtration rate, Ischemic Heart Disease and BMI were selected as outcome predictors. The study cohort characteristics were: mean age at baseline of 74 ± 13 years, 601 (50%) males, 664 (55%) of patients were on two or fewer hypertension medications, 861 (71%) were not on an ACE-I, 439 (36%) had coronary artery disease (CAD), 184 (15%) had GFR less than 40 ml/min, 51 (4%) had BMI less than 20, and 271 (22%) had a prior hospitalization for HF. The median follow-up time was 41 months. Age, hypertension, GFR less than 40 ml/min, BMI less than 20 and prior hospitalization were found to be independent predictors for mortality and HF hospitalization. Diastolic dysfunction and CAD were independent predictors for HF hospitalization only. Based on these variables and tested in the validation cohort, the HAD-AFIB score had a C-statistic of 0.72 (0.67-0.78) for mortality (HR=1.28 (1.20-1.36), p<0.01) and 0.77 (0.70-0.83) for HF hospitalization (HR=1.30 (1.19-1.41), p<0.01) scores respectively. **Conclusions:** Patients with HFPEF and AF can be risk stratified for mortality and heart failure hospitalization using the HAD-AFIB score.

The HAD-AFIB Score

Predictors	HF Hospitalization Points				Mortality Points			
Hypertension								
NOT on an ACE-I	1							
Total Number of Medications	1 per medication*				1 per medication*			
Avg Systolic BP								
>=120					0			
110-119					1			
100-109					2			
<100					3			
Age								
<60	0				0			
60-69	1				2			
70-79	2				4			
80-89	3				6			
>=90	4				8			
Diastolic Dysfunction Class III	2							
Admission for HF with EF ≥ 50%	2				1			
Filtration Rate (GFR<40)	2				2			
Ischemic Heart Disease - CAD	3							
BMI								
BMI<20	5				3			
BMI 20-29	0							
BMI 30-39	2							
BMI>=40	4							
Total Points+	**<=8**	**9-11**	**12-14**	**>14**	**<=5**	**6-9**	**10-12**	**>12**
Outcome Risk at 1 Year	1.1%	6.0%	11%	21%	3.6%	10%	24%	47%
Outcome Risk at 2 Years	2.1%	8.5%	16%	28%	5.7%	17%	38%	56%
Outcome Risk at 4 Years	3.3%	13%	24%	34%	10%	28%	56%	78%

*Hypertension Medications include: ACE-I, ARB, BB, CCB, Nitrates, Vasodilators, Diuretics
+Outcome risks based on total study cohort, N=1205

110

The Critical Role of Pulmonary Artery Wedge Pressure Saturation In The Standardization of Pulmonary Artery Wedge Pressure Measurement

Michael C. Viray, Eric L. Bonno, Nicholas Gabrielle, Jessica L. Atkins, Nicholas S. Amoroso, Valerian L.C. Fernandez, Anbukarasi Maran, Christopher D. Nielsen, Eric R. Powers, Daniel H. Steinberg, Thomas M. Todoran, Thomas G. Di Salvo, Gregory R. Jackson, Brian A. Houston, Ryan J. Tedford; Medical University of South Carolina, Charleston, SC

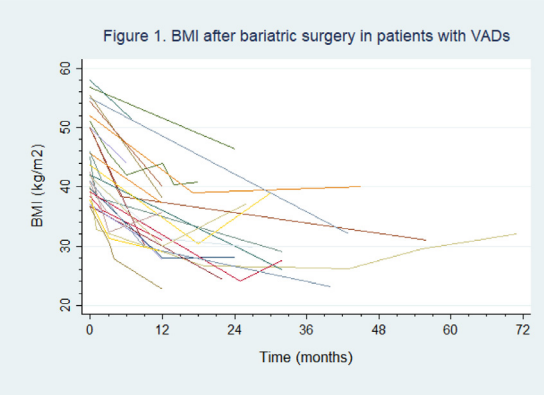
Introduction: Inadequate balloon occlusion while measuring pulmonary artery wedge pressure (PAWP) during right heart catheterization (RHC) may lead to inaccurate measures and clinically relevant misdiagnosis of disease. Following the 6th World Symposium on Pulmonary Hypertension (PH) recommendations, we instituted a standard of care clinical protocol at the Medical University of South Carolina that required obtaining a PAWP saturation (sat) to confirm complete occlusion whenever initially measured PAWP is >15 mmHg. We sought to determine: 1) The difference between initial and lowest reported PAWP 2) The frequency in which this practice leads to a change in PH classification 3) The overall success rate in obtaining a PAWP sat. **Methods:** After IRB approval, investigators not performing the RHC procedure prospectively collected demographic, echocardiographic and hemodynamic data. Subjects undergoing routine post-transplant RHC were excluded. After the initial PAWP measurement (as determined by the RHC operator), a PAWP sat was drawn to confirm occlusion (defined as >90% or within 5% of the systemic arterial oxygen saturation). If the PAWP sat did not confirm occlusion, the balloon was deflated and up to two additional attempts were made to re-measure the PAWP and confirm with a PAWP sat. PAWP were recorded at the same point in the respiratory cycle with each attempt. Repeated measures were compared using Signed Rank Test. **Results:** We enrolled 75 subjects (age 58.3 +/- 13.3 years, 60% men, 59% with LVEF <50%) who underwent RHC in our institution from September 2019 to March 2020 and had a PAWP > 15 mmHg. Despite apparent confirmation of PAWP position by fluoroscopy and/or typical hemodynamic waveforms, an occlusive PAWP sat was unable to be confirmed in 39 (52%) of subjects during the first attempt. In these subjects, the mean difference between initial and lowest PAWP was -4.1 +/- 7.7 mmHg (p<0.001) and PVR increased from 3.2 +/- 2.3 to 4.5 +/- 4.6 Wood Units (p<0.001). Twelve of the 39 subjects (31%) had a difference =/> 5 mmHg. Three of the 4 subjects referred for PH with preserved EF were ultimately reclassified as having pre-capillary PH. Eight of the 16 referred for advanced heart failure evaluation were re-classified as combined post- and pre-capillary PH with PVR > 3 WU, which then required vasodilator testing. With additional attempts, a PAWP sat was confirmed in 83% of subjects. There were no observed complications during additional PAWP attempts. **Conclusion:** The practice of requiring a PAWP sat resulted in significantly lower PAWP, higher PVR and clinically relevant disease reclassification. A PAWP sat is a simple and safe technique to verify an elevated PAWP during RHC.

111

BMI Trends In Patients With Ventricular Assist Devices After Bariatric Surgery

Adrian daSilva-deAbreu[1,2,3], Bader Aldeen Alhafez[4], Yuhamy Curbelo-Pena[5], Carl J. Lavie[1,2], Hector O. Ventura[1,2], Juan F. Loro-Ferrer[3], Stacy A. Mandras[1,2]; [1]Ochsner Clinic Foundation, New Orleans, LA; [2]The UQ Ochsner Clinical School, Faculty of Medicine, The University of Queensland., New Orleans, LA; [3]Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria, Spain; [4]The Ohio State University, Columbus, OH; [5]Consorci Sanitari de l'Alt Penedes i Garraf, Barcelona, Spain

Background: There is paucity of knowledge about the efficacy of bariatric surgery (BS) to achieve sustained weight loss in ventricular assist device (VAD) patients. Furthermore, the wide range of body mass index (BMI) and length of follow-up have made it impossible for small cohort studies to predict BMI trends after BS in VAD patients, in whom evidence from the general bariatric population may not be accurate. **Methods:** We conducted a systematic search in ClinicalTrials.gov, Cochrane, Embase and PubMed. We also screened for references in Google Scholar, meeting proceedings, journal sites, and among citations in included studies. We extracted individual participant data of obese patients with VADs who underwent BS. We used Spearman's correlation test to analyze trends in BMI data. $P < 0.05$ was considered statistically significant. **Results:** For the 29 patients included, the mean age was 41.9 ($\pm$ 12.2) years. All patients underwent either laparoscopic sleeve gastrectomy or laparoscopic Roux-en-Y gastric bypass. The baseline BMI at the time of BS was 45.2 ($\pm$ 6.7) kg/m^2. Every patient had lower BMI during follow-up than at the time of BS (Figure 1). Seven patients experienced some degree of weight gain $\geq$ 12 months after BS. There were statistically significant correlations (all $P < 0.0001$) between time (months) and trends in BMI (rho -0.662), cumulative BMI change (rho 0.885), and percentage of excess BMI (rho 0.860). Furthermore, 57.1% (16 of 28) of the patients achieved transplantation or myocardial recovery after weight loss. **Conclusions:** Obese patients with VADs experience significant decreases in BMI, especially in excess BMI, over time after undergoing BS, although some patients re-gained some weight after one year. These results are promising, but further research, ideally with large registries combining bariatric, VAD, and transplantation outcomes, could provide more valuable insight to help identify predictive factors and guide patient selection for BS with VADs.



112

Elevated Right And Left Sided Filling Pressures Determine Adverse Outcomes In Ambulatory Heart Failure With Preserved Ejection Fraction

Joban Vaishnav, Lisa R. Yanek, Virginia S. Hahn, Eunice Yang, Danielle Hopkins, Rishi Trivedi, Dhananjay Vaidya, David A. Kass, Kavita Sharma; Johns Hopkins University School of Medicine, Baltimore, MD

Introduction: Heart failure with preserved ejection fraction (HFpEF) constitutes approximately half of all heart failure (HF) hospitalizations. The driving force of pathophysiology and symptoms in HFpEF are elevated filling pressures. We sought to evaluate clinical outcomes by hemodynamic parameters in ambulatory HFpEF. **Methods:** We included patients referred to the Johns Hopkins HFpEF Clinic with a clinical diagnosis of HFpEF and right heart catheterization data. Baseline characteristics and clinical outcomes at 2 years were compared for patients with right atrial (RA) to pulmonary capillary wedge pressure (PCWP) ratio of <0.6 (low RA:PCWP group) to $\geq$0.6 (high RA:PCWP group) and with PCWP <20 mmHg (low PCWP group) to $\geq$20 mmHg (high PCWP group) using chi-squared, Wilcoxon, or log-rank tests. **Results:** Of the 161 patients included, 60 (37%) had an RA:PCWP ratio of $\geq$0.6 and 60 (37%) had a PCWP $\geq$20 mmHg. In the high RA:PCWP group, there was a significantly lower proportion of females and African Americans and lower systolic blood pressure compared to the low RA:PCWP group (Table). Patients with a high PCWP were significantly more obese, more likely to be on a beta-blocker, and had higher NT-proBNP compared to those with a low PCWP (Table). Clinical signs and symptoms of HF were not significantly different between groups, except for a higher proportion of patients with orthopnea in the low PCWP group. Event-free probability was significantly lower in the high RA:PCWP and PCWP groups compared to the low groups at 2 years (p=0.001 and 0.011 respectively, Figure). There was no significant difference in event-free probability by cardiac index (<2.2 L/min/m^2 v $\geq$ 2.2 L/min/m^2, p=0.591). **Conclusion:** Elevated right and left-sided filling pressures are a key determinant of clinical outcomes in ambulatory HFpEF. Clinical signs and symptoms of HF in an obese HFpEF population may not be a reliable metric of elevated filling pressures. Therefore, invasive hemodynamic assessment for prognostication and intensification of diuretic therapy should be considered. Future therapies in HFpEF should focus on accurate detection of congestion and novel strategies for enhanced natriuresis.

Table. Comparison of baseline characteristics by low and high right and left-sided filling pressures in ambulatory heart failure with preserved ejection fraction.

pressures in ambulatory heart failure with preserved ejection fraction.

	RA:PCWP <0.6 N=101	RA:PCWP ≥ 0.6 N=60	p-value	PCWP <20 mmHg N=101	PCWP ≥ 20 mmHg N=60	p-value
Age, years	65.0 (58.0, 72.0)	62.0 (54.5, 70.0)	0.098	64.0 (54.0, 71.0)	67.0 (57.5, 72.0)	0.394
Female Sex	73 (72.3)	32 (53.3)	0.015	68 (67.3)	37 (61.7)	0.466
AA Race	49 (48.5)	20 (33.3)	0.094	45 (44.6)	24 (40.0)	0.582
BMI, kg/m^2	37.4 (30.9, 45.4)	38.0 (33.5, 44.8)	0.542	36.2 (30.9, 44.6)	40.8 (33.4, 46.1)	0.049
Systolic blood pressure, mmHg	142.0 (130.0, 163.0)	137.5 (124.5, 149.0)	0.042	139.0 (128.0, 160.0)	141.0 (132.0, 159.5)	0.624
HF admission in prior 12 months	58 (58.6)	40 (67.8)	0.249	57 (57.6)	41 (69.5)	0.135
Hypertension	96 (96.0)	57 (95.0)	0.765	95 (94.1)	58 (98.3)	0.481
Diabetes	51 (51.0)	57 (95.0)	0.448	51 (50.1)	34 (56.7)	0.448
Atrial fibrillation	25 (25.0)	23 (38.3)	0.075	25 (24.8)	23 (39.0)	0.058
Medications						
Beta-blocker	52 (51.5)	30 (51.0)	0.938	44 (44.0)	38 (63.3)	0.018
ACE-I/ARB	58 (57.4)	33 (55.0)	0.764	59 (58.4)	32 (53.34)	0.529
Aldosterone antagonist	27 (26.7)	29 (48.3)	0.005	39 (38.6)	17 (28.3)	0.185
Loop diuretic	85 (84.2)	52 (86.7)	0.666	83 (82.2)	54 (90.0)	0.178
Furosemide equivalent loop diuretic dose, mg	70.0 (40.0, 120.0)	80.0 (40.0, 160.0)	0.066	80.0 (40.0, 160.0)	80.0 (40.0, 160.0)	0.258
eGFR, ml/min/1.73m^2	55.9 (35.0, 72.0)	55.5 (42.5, 77.0)	0.318	60.5 (40.5, 74.5)	48.0 (34.0, 67.5)	0.061
NT-proBNP, pg/mL	312.0 (103.0, 861.0)	221.0 (89.5, 739.0)	0.253	235.0 (85.0, 570.0)	415.5 (146.0, 1212.0)	0.009

Continuous variables are presented as median (interquartile range). Abbreviations: AA=African American, ACE-I=angiotensin converting enzyme inhibitor, ARB=angiotensin receptor blocker, eGFR=estimated glomerular filtration rate, HF=heart failure, RA= right atrial, PCWP=pulmonary capillary wedge pressure, 6MWT=six-minute walk test.

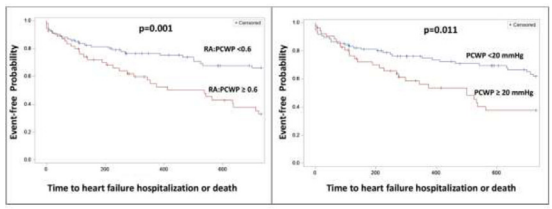


Figure. Kaplan-Meier curves for time to first heart failure hospitalization or death stratified by RA:PCWP ratio (**left**) and PCWP (**right**) in ambulatory heart failure with preserved ejection fraction patients.

Figure. Kaplan-Meier curves for time of first heart failure hospitalization or death stratified by RA:PCWP ratio (**left**) and PCWP (**right**) in ambulatory heart failure with preserved ejection

113

Burden of Cardiogenic Shock In Patients With Takotsubo Syndrome: A National Perspective

Moinuddin Syed, Muhammad Zia Khan, Sudarshan Balla; West Virginia University, Morgantown, WV

Introduction: There is limited data on the incidence of cardiogenic shock (CS) among patients with Takotsubo Syndrome (TTS). We aimed to study the incidence, predictors and outcomes of CS in patients with TTS. **Methods:** We used the National Inpatient Sample (NIS) database from September 2006 to December 2017 to identify all patients with TTS using the appropriate diagnostic codes. Patients with TTS were divided into those with and without CS and the two groups were compared in regard to demographics, medical comorbidities, resource utilization, cost of hospitalization and length of stay. Logistic regression analysis was used to identify predictors of CS in patients with TTS. **Results:** A total of total of 265,423 patients with TTS were included in our study, of whom 14703 (5.5%) were diagnosed with cardiogenic shock (CS). TTS Patients with CS were more likely to be younger (67, IQR [56.6-75] years vs 68, IQR [58-78] years), males (20.9% vs 13.8%, P<0.01) with key ethnicities being Asian, Hispanics and blacks. TTS patients with CS were also more likely to have multiple medical comorbidities at baseline including congestive heart failure (65.7% vs 40.9%, p <0.01), chronic lung disease(31.1 vs 29.2, p<0.01) diabetes with chronic complications(7.4% vs 5.6%, P<0.01), metastatic cancer(3.2% vs 2.3%, P<0.01), lymphoma(1.2% vs 0.9%, P<0.01), renal Failure(13.2% vs 11.1% p<0.01), cerebrovascular disease(11.1% vs 7.3%, and peripheral vascular disease(9.9% vs 8.2%, P<0.01). TTS patients with CS had a higher incidence of ventricular tachycardia or ventricular fibrillation (15% vs 4.6%, p<0.01) and non-shockable cardiac arrests (12.2% vs 2.3%, p<0.01). In-hospital mortality among patients with TTS-CS was fivefold higher compared to those without CS (22.9% vs 4%, p<0.01). Moreover,