Kousik Krishnan MD, FHRS, Richard G. Trohman BS, MBA, MD, FHRS and Parikshit S. Sharma MD, MPH, FHRS
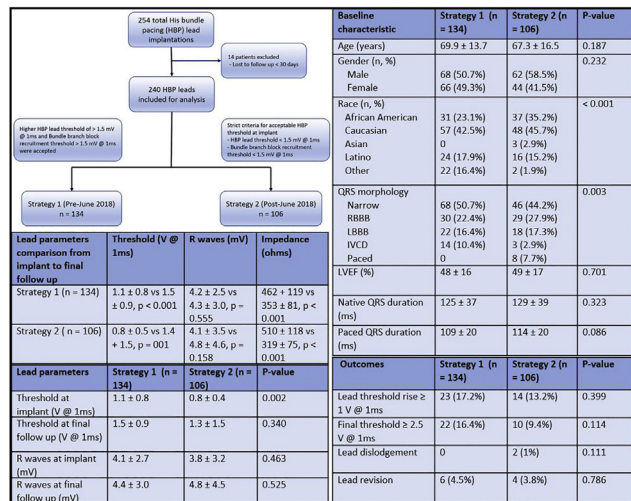
Background: His bundle pacing (HBP) is a form of conduction system pacing with left bundle branch pacing emerging as an alternative. It is unclear if higher HBP lead thresholds at implant are associated with increased lead related complications in long term follow up.

Objective: We sought to evaluate if a new strategy of accepting HBP if the lead threshold is < 1.5 V @ 1 ms at implant was associated with better long term HBP lead related outcomes.

Methods: Pacemaker or CRT devices with HBP leads implanted between 08/01/2016 to 03/01/2020 at our center were included. Prior to 06/2018 we accepted HBP lead threshold < 1.5 V and up to 2.5V @ 1ms (Strategy 1) at implant. Subsequently, we only accepted HBP if the threshold at implant was < 1.5V @ 1ms (including bundle branch block (BBB) recruitment)(Strategy 2) (Figure). The two strategies were compared in lead performance.

Results: A total of 254 patients underwent HBP of which 240 patients were included in the analysis. A 134 patients underwent implant using strategy 1 while 106 patients underwent implant using strategy 2. The mean age was 70 $\pm$ 14 years. The average follow up was 2.4 $\pm$ 1.2 years (strategy 1) and 1.5 $\pm$ 0.7 years (strategy 2). There was a non significant trend towards a lower incidence of rise in HBP threshold by ≥ 1 V @ 1ms using Strategy 2 (17.2% vs 13.2%, p = 0.399). Lead revisions (4.5% vs 3.8%, p = 0.786) and HBP threshold ≥ 2.5 V @ 1ms in follow-up (16.4% vs 9.4%, p = 0.114) demonstrated a similar trend without statistical differences. A subgroup analysis of patients with and without BBB revealed similar findings.

Conclusion: Implant HBP lead thresholds < 1.5 V @ 1ms demonstrated a non-significant trend towards improved lead performance during long-term follow up.

Baseline characteristic	Strategy 1 (n = 134)	Strategy 2 (n = 106)	P-value
Age (years)	69.9 ± 13.7	67.3 ± 16.5	0.187
Gender (n, %)			0.232
Male	68 (50.7%)	62 (58.5%)	
Female	66 (49.3%)	44 (41.5%)	
Race (n, %)			< 0.001
African American	31 (23.1%)	37 (35.2%)	
Caucasian	57 (42.5%)	48 (45.7%)	
Asian	0	3 (2.9%)	
Latino	24 (17.9%)	16 (15.2%)	
Other	22 (16.4%)	2 (1.9%)	
QRS morphology			0.003
Narrow	68 (50.7%)	46 (44.2%)	
RBBB	30 (22.4%)	29 (27.9%)	
LBBB	22 (16.4%)	18 (17.3%)	
IVCD	14 (10.4%)	3 (2.9%)	
Paced	0	8 (7.7%)	
LVEF (%)	48 ± 16	49 ± 17	0.701
Native QRS duration (ms)	125 ± 37	129 ± 39	0.323
Paced QRS duration (ms)	109 ± 20	114 ± 20	0.086

Lead parameters comparison from implant to final follow up	Threshold (V @ 1ms)	R waves (mV)	Impedance (ohms)
Strategy 1 (n = 134)	1.1 ± 0.8 vs 1.5 ± 0.9, p < 0.001	4.2 ± 2.5 vs 4.3 ± 3.0, p = 0.555	462 + 119 vs 353 ± 81, p < 0.001
Strategy 2 (n = 106)	0.8 ± 0.5 vs 1.4 + 1.5, p = 001	4.1 + 3.5 vs 4.8 ± 4.6, p = 0.158	510 + 118 vs 319 ± 75, p < 0.001

Lead parameters	Strategy 1 (n = 134)	Strategy 2 (n = 106)	P-value
Threshold at implant (V @ 1ms)	1.1 ± 0.8	0.8 ± 0.4	0.002
Threshold at final follow up (V @ 1ms)	1.5 ± 0.9	1.3 ± 1.5	0.340
R waves at implant (mV)	4.1 ± 2.7	3.8 ± 3.2	0.463
R waves at final follow up (mV)	4.4 ± 3.0	4.8 ± 4.5	0.525

Outcomes	Strategy 1 (n = 134)	Strategy 2 (n = 106)	P-value
Lead threshold rise ≥ 1 V @ 1ms	23 (17.2%)	14 (13.2%)	0.399
Final threshold ≥ 2.5 V @ 1ms	22 (16.4%)	10 (9.4%)	0.114
Lead dislodgement	0	2 (1%)	0.111
Lead revision	6 (4.5%)	4 (3.8%)	0.786

B-PO03-061

DECREASED ACTIVITY AND ATRIAL ARRHYTHMIAS IN PATIENTS WITH CRT DEVICES DURING THE COVID-19 PANDEMIC

Joshua Lang MD, MS, Enrico G. Ferro MD, Aneesh Bapat MD, Blake Oberfeld, Krishan Sharma, Guohai Zhou PhD, Jagmeet P. Singh MD, PhD, FHRS and Usha B. Tedrow MD, MS, FHRS

Background: The public health response to COVID-19 pandemic resulted in social distancing, stay-at-home orders, and quarantine. The effects of these measures on patient health is

poorly understood. The expected effect on atrial arrhythmias is difficult to predict.

Objective: To determine the effects of the pandemic on physiologic parameters and atrial arrhythmias among cardiac resynchronization therapy (CRT) patients the Massachusetts General Brigham healthcare system.

Methods: We extracted clinical characteristics and inpatient/outpatient utilization data from the electronic medical record. We extracted CRT parameters from the Medtronic Carelink database from March 1st through June 30th in both 2019 (pre-COVID) and 2020 (COVID). Atrial arrhythmias were recorded in the Medtronic Cardiac Compass.

Results: Our cohort (n=394) had a median age of 71, was 71% male, and 84% Caucasian. Of these patients 64% had a non-ischemic cardiomyopathy and 53% was NYHA class I-II. From 2019 to 2020, heart rate variability decreased by 4.3% (p<0.001), while patients' nighttime and daytime heart rate decreased by 0.9% (and 2.1% (p<0.001 for both). The average total activity level decreased from 166 to 141 minutes per day (p<0.001). There was also a 17% decrease in the total time in atrial arrhythmias (qualifying for inclusion in Cardiac Compass data, p<0.001).

Conclusion: These findings together show decreased physical activity, heart rate, heart rate variability, and burden of atrial arrhythmias in patients with CRT, associated with the start of the pandemic. Further investigation is needed to clarify the exact mechanism of this observation.
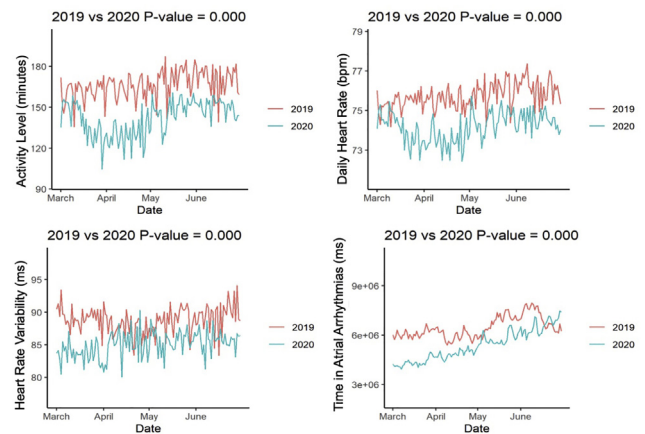
B-PO03-062

EFFECT OF THE COVID-19 PANDEMIC ON OUTPATIENT CARE OF PATIENTS WITH CRT DEVICES

Krishan Sharma, Aneesh Bapat, Joshua P. Lang MD, MS, Enrico G. Ferro MD, Guohai Zhou, Blake Oberfeld, Parinita A. Dherange MBBS, Usha B. Tedrow MD, MS, FHRS and Jagmeet P. Singh MD, PhD, FHRS

Background: The COVID-19 pandemic has posed unique challenges to outpatient care delivery, particularly for patients with CRT devices.

Objective: Among patients with CRT devices, we aimed to identify patient and device-related characteristics that may predict outpatient utilization during the COVID-19 pandemic compared to an analogous pre-COVID period. We sought to identify subsets of patients that may be particularly susceptible to suboptimal care.

Methods: We performed a retrospective analysis of demographics, comorbidities, device-detected parameters and their association with cardiac outpatient utilization among Medtronic CRT patients within the Mass General Brigham

System. Data was extracted from the Medtronic Carelink database between March 1st through June 30th of both 2019 and 2020. Paired t-test or chi-squared tests were performed as appropriate, and a p-value <0.05 was considered statistically significant.

Results: Among 394 patients, in-person outpatient visits decreased 4.5-fold, from 576 in 2019 to 126 in 2020, while virtual visits increased ∼17-fold from 21 to 350 (p<0.0001). In univariate analysis with 15 variables of interest, parameters significantly associated with outpatient encounters in 2020 included male gender, white race, presence of ischemic cardiomyopathy (iCM), advanced (NYHA class III or IV) heart failure, use of anti-arrhythmic drugs, and higher levels of device-detected non-sustained tachycardia. Notably, an under-represented minority status was significantly associated with a reduction in outpatient encounters. Among all outpatient encounters, there was no association between demographics (age, gender, race) and use of in-person versus virtual outpatient care.

Conclusion: Among CRT patients in a large urban healthcare system, there was a significant shift towards virtual outpatient care in 2020. A significant reduction in outpatient encounters were noted in under-represented minorities. No single demographic characteristic was associated with the mechanism of outpatient care, i.e. in-person versus virtual.

B-PO03-063

ARRHYTHMIA PATTERNS OF PATIENTS ON IBRUTINIB

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Sanjiv M. Narayan MD, PhD, FHRS, June-Wha Rhee MD and
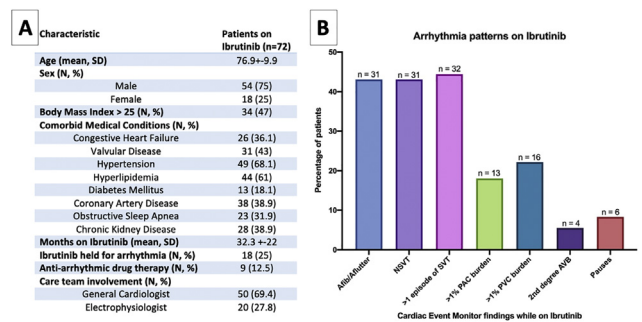Tina Baykaner MD, MPH*

Background: Ibrutinib, a tyrosine kinase inhibitor, used in chronic lymphocytic leukemia, has been associated with increased incidence of atrial fibrillation (AF); with limited data on its association with ventricular tachyarrhythmias. There are no reports to date that comprehensively analyze atrial and ventricular arrhythmia burden in patients on Ibrutinib.

Objective: Describe arrhythmia patterns of patients on Ibrutinib therapy.

Methods: A retrospective data analysis at a single center using electronic medical records database search tools and individual chart review was conducted to identify consecutive patients who had holter monitors while on Ibrutinib therapy.

Results: 72 patients were included in analysis (Figure, panel A). Most common arrhythmias documented were supraventricular tachycardia (SVT, n=32), AF (n=31), and nonsustained ventricular tachycardia (NSVT n=31). 13 patients had >1% premature atrial contraction (PAC) burden; 16 patients had >1% premature ventricular contraction (PVC) burden (Figure, panel B). A small proportion of patients were followed by electrophysiologists (n=20, 27.8%), whereas a higher proportion were followed by cardiologists (n=50, 69.4%). In 25% of the patients, Ibrutinib was held because of arrhythmias. 12.5% of patients were started on antiarrhythmic drugs during Ibrutinib therapy to manage these arrhythmias.

Conclusion: In this largest dataset reported to date of holter monitors on patients treated with Ibrutinib, increased burden of both atrial and ventricular arrhythmias are shown, with a high incidence of treatment interruption secondary to arrhythmias and a low rate of referral to specialists for arrhythmia management.

Characteristic	Patients on Ibrutinib (n=72)
Age (mean, SD)	76.9+-9.9
Sex (N, %)	
Male	54 (75)
Female	18 (25)
Body Mass Index > 25 (N, %)	34 (47)
Comorbid Medical Conditions (N, %)	
Congestive Heart Failure	26 (36.1)
Valvular Disease	31 (43)
Hypertension	49 (68.1)
Hyperlipidemia	44 (61)
Diabetes Mellitus	13 (18.1)
Coronary Artery Disease	38 (38.9)
Obstructive Sleep Apnea	23 (31.9)
Chronic Kidney Disease	28 (38.9)
Months on Ibrutinib (mean, SD)	32.3 +-22
Ibrutinib held for arrhythmia (N, %)	18 (25)
Anti-arrhythmic drug therapy (N, %)	9 (12.5)
Care team involvement (N, %)	
General Cardiologist	50 (69.4)
Electrophysiologist	20 (27.8)

Arrhythmia patterns on Ibrutinib

B-PO03-064

WEARABLE CARDIAC DEVICE IN PATIENTS WITH CANCER

David Boone, Cezar Iliescu, Jawad Chohan, Carl Zehner, Nicolas Palaskas and Kaveh Karimzad

Background: Cancer patients have variable survival, multiple comorbidities such as coagulopathy which can limit implantable device use. Wearable cardiac-defibrillators (WCD) such as the LifeVest can provide protection against ventricular arrhythmia (VA) while patients transition to more sustainable therapies or palliation.

Objective: Our aim is to provide insight on WCD use in patients with cancer by evaluating appropriate clinical use of WCD, including compliance, appropriate shocks, evaluation of patients who had recovery of systolic function, implantation of ICD, or transition to palliative care.

Methods: All patients at MD Anderson Cancer Institute with cancer who were equipped with a WCD therapy between January 2010 and December 2020 over the age of 18 with reduced systolic function or sustained ventricular tachycardia causing syncope or sudden cardiac death were included. A chart review of each patient to evaluate baseline characteristics of each patient was performed. WCD data was extracted from the device.

Results: Overall, 87 patients were identified for this study with a mean age of 63 ± 3 years, 44% women): 23% with ischemic cardiomyopathy, 63% nonischemic, and 14% with a normal EF. The indication for device was systolic dysfunction as a bridge to definitive therapy in up to 79% of patients with 16% considered for VA and 5% for off-label indications. Three patients experienced a VA while a WCD was equipped without mortality. Median WCD usage period was 37 (1-357) days with an average wear time of 20.24 +/- 4.70 hours per day and a median daily wear time of 22 hours (2.1-24). A total of 2 participants (2%) received at least one appropriate shock, giving an incidence of appropriate therapy of 0.16 per patient year of device use. Up to 23% of patients in our population recovered their ejection fraction on re-assessment and 23% underwent ICD placement.

Conclusion: WCD is an effective means to manage patients at high risk of ventricular arrythmia in the transient setting of cancer patients with a high risk of VA. WCD can prevent unnecessary ICD implantation, provide a potential cost benefit, and increased quality of life benefit for these patients. Additional studies are needed to further understand the effectiveness of WCD in cancer patients.