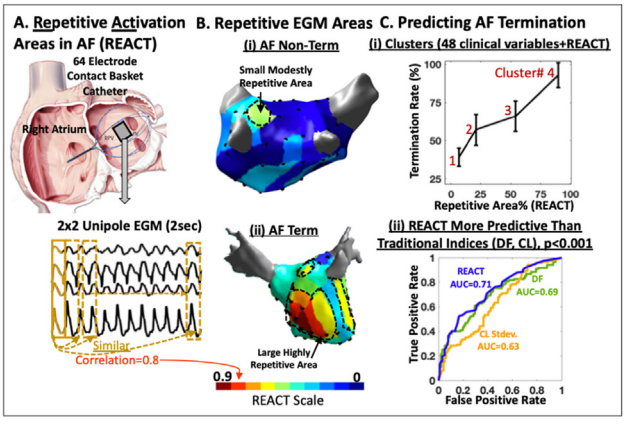
DF or CL (p<0.001 ANOVA). Combining indices provided AUC 0.80 for AF termination.
Conclusion: Repetitive islands of AT-like activity in AF provide an intuitive metric of organization. Larger areas of such islands predict acute response to therapy better than a comprehensive set of clinical variables or other organization indices.

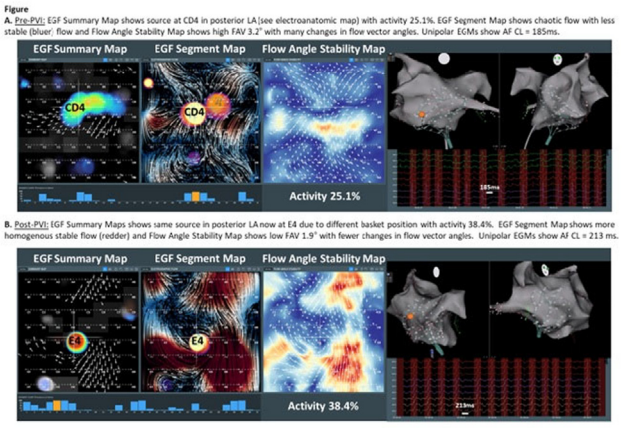


CA-529-04

EFFECT OF PULMONARY VEIN ISOLATION ON ELECTROGRAPHIC FLOW-IDENTIFIED EXTRA-PULMONARY VEIN SOURCES PRE- V. POST-ABLATION

Petr Neuzil MD; Melissa H. Kong MD, FHRS; Joshua D'Arcy MD; Jan Petru MD; Moritoshi Funasako MD, PhD; Jan Skoda; Stepan Kralovec MD; Martin Mudroch; Peter Ruppersberg MD and Vivek Y. Reddy MD

Background: Pulmonary vein isolation (PVI) is the cornerstone for atrial fibrillation (AF) treatment; however, its efficacy for persistent AF remains suboptimal. Electrographic Flow (EGF) mapping visualizes near real-time cardiac action potential flow to identify extra-PV sources and flow directionality over time.
Objective: Analyze effect of PVI on extra-PV AF source activity (SAC), AF cycle length (CL) and stability of flow angle variability (FAV).
Methods: Pre-PVI, unipolar electrograms were recorded for 1 min from a 64-pole basket to generate EGF maps. Relevant AF sources are identified as reproducible patterns of centrifugal EGF activation with prevalence of SAC >20% calculated over 60 sec. EGF pattern determines whether flow directionality remains stable over time or shows high FAV, measuring by how many degrees mean flow vector angle changes. Post-PVI EGF maps recorded once PVI confirmed.
Results: Prospective study of 14 patients undergoing de novo PVI, mean age 63.9±9.0 years, mean LA size 42.9±4.7 mm, mean AF duration 25.9±29.6 months. Pre-PVI, 44.7% (21/47) of sources in LA; 55.3% (26/47) in RA. Of sources remaining post-PVI, 52.1% (25/48) sources were in LA; 47.9% (23/48) in RA. In LA, PVI resulted in 5.0% increase in SAC (p=0.003), 6.9 ms increase in AF CL (p=<0.001), and 0.28° decrease in FAV (p=<0.001). In RA, PVI resulted in 5.5% increase in SAC (p=0.004), 7.4 ms increase in AF CL (p=<0.001), and 0.23° decrease in FAV (p=0.028).
Conclusion: Elimination of electrical conduction from PV triggers results in increased extra-PV SAC; slowing AF CL and stabilization of FAV. PVI may unmask extra-PV AF drivers and stepwise elimination of drivers starting with PV triggers followed by extra-PV sources simplifies AF conduction patterns.



ABSTRACT CI-524:
Appropriate, inappropriate or delayed ICD shocks: current data

Friday, April 29, 2022
1:00 PM - 2:00 PM

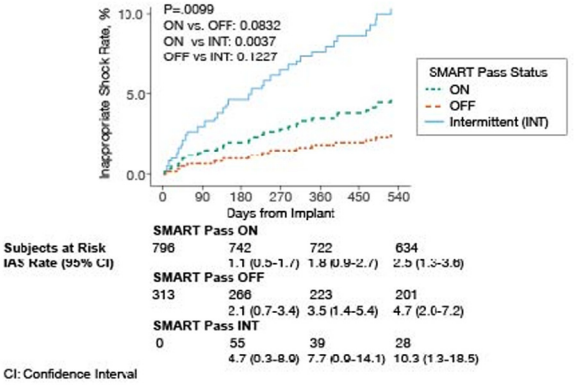
CI-524-01

THE IMPACT OF SMART PASS ALGORITHM STATUS ON INAPPROPRIATE SHOCK RATES IN THE UNTOUCHED STUDY

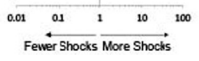
Lucas V.A. Boersma MD, PhD; Johan D. Aasbo DO, FHRS; Reinoud Knops MD, PhD; Pier D. Lambiase BCH, BM, MBChB, PhD, FHRS; Maria Grazia Bongiorni MD; Jean-Claude Deharo MD; Andrea M. Russo MD, FHRS; Martin C. Burke DO; Ali H. Shakir MD; Ricky A. Henderson MD, FHRS; David T. Huang MD, FHRS; Ursula Appl BSBME; Amy Brisben PhD, CCDS; Nathan Carter MS; Mikhael F. El-Chami MD, FHRS and Michael R. Gold MD, PhD, FHRS

Background: The current Subcutaneous ICD (S-ICD) incorporates SMART Pass (SP) to improve sensing and discrimination capabilities to reduce inappropriate shocks (IAS). SP status is programmable but may be disabled automatically based on electrogram (EGM) characteristics.
Objective: To evaluate SP status' impact on IAS, appropriate shocks (AS), complications and mortality in the UNTOUCHED S-ICD trial.
Methods: Primary prevention patients (pts, n=1111) with ejection fraction ≤35% and no pacing requirement were followed for up to 18 months. SP status during a study visit was programmed ON or OFF and status between visits was either consistently OFF, ON, or automatically disabled (DIS). The impact of SP status on pt outcomes was evaluated using Kaplan-Meier (K-M) analysis. Multivariable proportional hazard analysis identified IAS predictors.
Results: Percent of pts with SP always ON, always OFF, ON with DIS, and OFF then ON with no DIS were 56, 16, 15, and 13%, respectively. High blood pressure (81.3%, p=.009) and kidney disease (17.0%, p=.059) were highest in pts with SP always OFF. Reasons for SP DIS included PVCs and low EGM amplitudes. K-M IAS rates differed significantly with SP status: pts post DIS had highest IAS rates (fig); SP ON vs OFF was a significant predictor of fewer IAS. While neither AS (p=0.58) nor complication (p=0.58) rates changed significantly, mortality differed significantly between pts with SP always ON, always OFF, ON with DIS, and OFF then ON with no DIS (4.8, 9.1, 3.1, and 3.7%, respectively; p=0.044).

Conclusion: Patients in the UNTOUCHED trial with SMART Pass (SP) consistently ON had significantly fewer inappropriate shocks. SP status had no impact on appropriate therapy for VT/VF or complications.



Variable	Hazard Ratio	P-value
History of AF	3.66 (1.71-7.84)	.0009
Kidney disease	0.29 (0.07-1.22)	.092
Two incision technique	4.22 (1.48-11.99)	.0070
DFT performed within first 30 days	2.35 (0.80-6.88)	.12
SMART Pass INTERMITTENT vs OFF	1.75 (0.61-5.04)	.30
SMART Pass ON vs OFF	0.44 (0.21-0.93)	.031



CI-524-02

ASSOCIATION BETWEEN DEVICE-DETECTED SLEEP APNEA AND IMPLANTABLE DEFIBRILLATOR THERAPY IN PATIENTS WITH HEART FAILURE

Andrea Mazza MD; Maria Grazia Bendini MD; Valter Bianchi MD; Cristina Esposito MD; Leonardo Caló MD; Chiara Andreoli MD; Vincenzo Ezio Santobuono MD; Antonio Dello Russo MD, PhD; Marcello Brignoli MD; Domenico Pecora MD; Claudia Baiocchi MD; Giovanna Giubilato MD, MHS; Antonio Rapacciuolo MD, PhD; Sergio Valsecchi and Giuseppe Boriani MD, PhD

Background: Sleep-disordered breathing is highly prevalent in heart failure (HF) and it has been suggested as a risk factor for malignant ventricular arrhythmias. The Respiratory Disturbance Index (RDI) algorithm computed by select implantable cardioverter defibrillators (ICDs) can identify severe sleep apnea (SA).
Objective: In the present analysis we evaluated the association between ICD-detected SA and the incidence of appropriate ICD therapy in patients with HF.
Methods: We enrolled 411 HF patients (age 69±10years, 77% male, ejection fraction 32±8%), implanted with an ICD endowed with an algorithm (ApneaScan, Boston Scientific) that calculates the RDI each night. In this analysis the weekly mean RDI value was considered. The endpoint was the first appropriate ICD shock. The median follow-up was 26 months [25th-75th percentile: 16-35].
Results: During follow-up, one or more ICD shocks were documented in 58 (14%) patients. Patients with shocks were younger (66±13years versus 70±10years, p=0.038), and more frequently implanted for secondary prevention (21% versus 10%, p=0.026). The maximum RDI value calculated during the entire follow-up period did not differ between patients with and without shocks (55±15episodes/h versus 54±14episodes/h, p=0.539). However, the ICD-detected RDI showed a considerable variability during follow-up. The overall median of the weekly RDI was 33episodes/h [25th-75th percentile: 24-45]. Using a time-dependent Cox regression model, the continuously measured weekly mean RDI≥45episodes/h was independently associated with shock occurrence (HR:4.63, 95%CI:2.54-8.43, p<0.001), after correction for baseline confounders (age, secondary prevention).
Conclusion: In HF patients, patients were more likely to receive appropriate ICD shocks during periods of time when they exhibited more sleep-disordered breathing.

CI-524-03

INAPPROPRIATELY DELAYED THERAPIES FOR VENTRICULAR ARRHYTHMIAS IN BIOTRONIK IMPLANTABLE CARDIOVERTER DEFIBRILLATORS

Adam Oesterle MD; Sanket Dhruva; Cara N. Pellegrini MD, FHRS and L. Bing Liem DO, FHRS, CCDS

Background: Implantable cardioverter defibrillators (ICD) are typically programed with multiple treatment zones and discriminators to minimize inappropriate therapies for supraventricular tachycardia while still delivering life saving therapies for ventricular tachycardia (VT) and fibrillation (VF). Biotronik ICDs freeze the VT counters when tachycardia is in the VF zone due to lack of discriminators in the VF zone, which may result in an inappropriate delay in tachycardia detection.
Objective: To assess the incidence of inappropriately delayed therapies for ventricular arrhythmias in Biotronik ICDs.
Methods: Patients with Biotronik ICDs were identified from four Veterans Affairs facilities. Patient information and device tracings for patients with transmission for any (i.e. appropriate or inappropriate) ICD therapies were examined to assess for delayed tachycardia detection.
Results: Among 52 veteran patients with Biotronik ICDs, 7 (13%) experienced ICD therapy. Four patients had ICD therapy for ventricular arrhythmias, two of whom experienced an inappropriate delay in VT/VF detection due to the tachycardia rate oscillating between the VT and VF treatment zones. One ICD was an Acticor 7 HF-T QP cardiac resynchronization therapy ICD with a VT treatment zone at 188 beats per minute (bpm) and VF treatment zone at 240 bpm. The delay in tachycardia detection due to suspension of the VT counters during VF was 10 seconds with an overall VF time of 31 seconds before ICD shock (figure). The other was an Intica 7 VR-T DX with a VDD right ventricular (RV) lead (RV lead with atrial sensing) with a VT treatment zone at 171 bpm and VF treatment zone of 214 bpm with a tachycardia detection delayed by 1.6 seconds due to oscillation between the VT and VF treatment zones.
Conclusion: Because contemporary Biotronik ICDs freeze the VT counters when tachycardia is in the VF zone, ICD therapies can be inappropriately delayed when the tachycardia oscillates between the VT and VF zone. Programming short detection intervals in the VT zone may be necessary to avoid a significant delay in life-threatening ventricular arrhythmia detection and therapy.

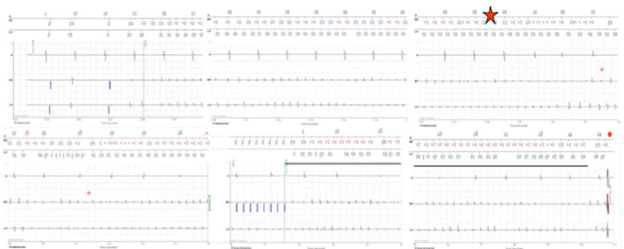


Figure: Inappropriately delayed therapies due to a ventricular arrhythmia oscillating between the ventricular tachycardia and ventricular fibrillation treatment zones with freezing of the ventricular tachycardia counters in a Biotronik Defibrillator. The ventricular tachycardia detection is set at 30 beats and the ventricular fibrillation detection is 20/26. ★ Demonstrates where tachycardia would have been detected if the ventricular tachycardia counters were not frozen when the tachycardia accelerated to the ventricular fibrillation zone. * Demonstrates undersensing that resets the ventricular tachycardia counters. ² The first beat of tachycardia that results in tachycardia detection. ¹ Ventricular fibrillation is detected. ♦ Shock is delivered.