Results: The final analysis included 902 patients. Among them, 342 (37.9%) had a previous first-degree atrioventricular block and 13.2% had a new one after TAVI. Two hundred and seven patients (23.0%) received a PPI for conductive disorders. The mean analysable PR prolongation in 779 patients was 8626 ms, the risk of developing a HGCD was estimated at 30.6% when PR prolongation was >40 ms. Multivariable analysis revealed that prolongation of PR interval >40 ms on D1 was by itself associated with the occurrence of these HGCD (HR = 4.9 [2.5 ; 10.0], p<0.001) more significantly than pre-existing right bundle branch block (HR 3.6 [1.7 ; 7.7], p =0.001) or de novo left bundle branch block (HR 2.8 [1.5 ; 5.2], p=0.001).

Conclusion: PR interval prolongation >40 ms at D1 of transcatheter aortic valve implantation is a critical factor to consider in estimating the risk of PPI for HGCD.

PO-618-02
AN AUTOMATED ALGORITHM TO ENHANCE ANTI-TACHYCARDIA PACING EFFICACY BY ATTENUATING RE-INITIATION OF VENTRICULAR TACHYCARDIA
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Background: Re-initiation is one of mechanisms of anti-tachycardia pacing (ATP) failure. Detecting initial VT termination and truncating subsequent ATP pulses may increase ATP efficacy.

Objective: To develop a proof-of-concept algorithm: Early Termination Detection Algorithm (ETDA), to automatically sense VT termination and cease further pulses based on sensed electrograms (EGMs) from implanted devices.

Methods: A cohort of 7 porcine infarcted ventricular computational models were subject to virtual induction (rapid-pacing) protocols to induce VTs. Functional model properties were adjusted to provide 73 unique VT episodes. Five common sensing EGM vectors from implanted devices were recovered from simulations during ATP application to develop the ETDA. Specifically, correlation coefficients (CCs) of the EGMs between two successive ATP pulses were calculated and averaged to identify sudden changes in EGM morphology, that indicate VT termination (Fig A). A discriminating threshold on the CCs was chosen by comparing all re-initiation cases with detailed analysis of the actual VT termination time observed from simulation results. ETDA was then applied to all cases to identify initial termination and improvement in efficacy.

Results: Before ETDA application, ATP terminated 42 cases (58%, Fig C), with re-initiation attributing to 11 (35%) of ATP failures. Application of ETDA accurately detected VT termination in 91% re-initiated cases and 90% terminated cases (Fig B), improving overall efficacy to 71% (Fig C).

Conclusion: Realtime sensing and analysis of EGMs during ATP application may be used to identify successful VT termination, truncating subsequent pulses that may re-initiate the VT, enhancing overall ATP efficacy.

PO-618-03
REDUCTION IN DEFIBRILLATION THRESHOLD BY MODIFICATIONS TO THE SUBCUTANEOUS ICD COIL
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Background: Subcutaneous Implantable Cardioverter Defibrillators (S-ICDs) generally have higher defibrillation thresholds (DFTs) than transvenous ICDs, necessitating larger S-ICD generators and with S-ICD VF conversion testing recommended at implantation.

Objective: We sought to determine whether modifications to the S-ICD coil configuration or characteristics would reduce DFTs compared to the standard S-ICD coil based on a computer model of defibrillation.

Methods: We utilized a computer model built from MRI images of a normal thorax and simulation of electrical fields generated by defibrillation. The specific electrical properties of tissues and organs were assigned, as well as other characteristics of the shock circuit, with DFT defined as energy required to achieve an electrical field of 4V/cm in 95% of ventricular myocardium. Coil configurations examined included a standard parasternal S-ICD coil, dual parallel para-sternal coils, dual coils in series (parasternal and along the left ribcage), and a larger flattened parasternal coil.

Results: The standard parasternal S-ICD coil configuration (with < 1mm intervening fat under the coil and generator) resulted in an estimated DFT of 33J. The other coil configurations resulted in marked reductions in DFT by as much as 37% (to 21J) (figure), predominantly related to lower shock impedance and improved electrical field distribution.
**PO-618-04**

LONGEVITY OF MODEL-3501 SUBCUTANEOUS IMPLANTABLE DEFIBRILLATOR LEAD IN CLINICAL PRACTICE

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**Background:** In December 2020, the subcutaneous implantable cardioverter-defibrillator (S-ICD) lead model-3501 was subject to a safety notification because of increased risk of fracture at a location just distal to the proximal sense ring. The manufacturer’s product performance report currently reports a lead survival probability of 98.8% at 45 months. However, no multicenter long-term performance information exists for this lead.

**Objective:** To assess the longevity of model-3501 leads and to compare it with that of the previous model-3401.

**Methods:** This analysis included consecutive patients who received an S-ICD with a model-3501 or a model-3401 lead at 66 Italian centers of the Rhythm Detect registry. A lead failed if it required extraction/replacement because of abnormalities suggestive of a structural defect, e.g. out-of-range impedance, nonphysiological electrical noise or ineffective therapy.

**Results:** From January 2013 to July 2021, 2403 patients were implanted and followed up (78% male, age 49±15years). A 3501-model lead was used in 1697 patients and a 3401-model in 706 patients. During a median follow-up of 38 months (25th-75th percentile: 24-55), we detected 4 malfunctioning model-3501 leads and 2 model-3401 leads. After analysis of the returned leads by the manufacturer’s technical services, a single model-3501 lead failure was a fracture distal to the proximal sense ring. The manufacturer’s product performance report currently reports a lead survival probability of 98.8% at 45 months. However, no multicenter long-term performance information exists for this lead.

**Conclusion:** Our modeling work suggests that modifications to the S-ICD coil design could lead to marked reductions in DFT. This could allow for the creation of S-ICDs with lower energy requirements and correspondingly smaller generators compared to current devices and might obviate the need for VF conversion testing with S-ICDs.

**PO-618-05**

DEEP LEARNING ALGORITHMS FOR SCREENING OF LEAD NOISE IN ELECTROCARDIOGRAMS TRANSMITTED BY CARDIAC IMPLANTABLE ELECTRONIC DEVICES

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**Background:** Electrograms (EGM) remotely transmitted by cardiac implantable electronic devices (CIEDs) may show signs of lead noise.

**Objective:** We tested different deep neural architectures for detection of noise amongst episodes labeled as non-sustained ventricular tachycardia (NSVT).

**Methods:** A total of 10,471 NSVT episodes from 805 patients implanted with a Boston Scientific CIED were used, each composed of a right ventricular near-field signal and possibly a right atrial and/or a far field signal, depending on the device model. The highly unbalanced dataset (6% of positive events corresponding to noise versus 94% of NSVT) was divided into 3 datasets: training (4,998 episodes), validation (2,621 episodes), and test (2,843 episodes). Five deep learning approaches, including state-of-the-art architectures based on convolutional neural networks (CNN) and ResNet, were trained and optimized to tested. Results were evaluated using a clinically relevant F2 score, prioritizing noise detection over precision.

**Results:** A CNN-based network (2DFT-CNN) that used 2D/3D maps of the ventricular bipolar signal as input gave the best results on the test set (F2=0.914), outperforming a ResNet pre-trained with electrocardiogram data and with transfer learning (2DFT-ResNet) (F2=0.863). However, a CNN network based on a naive ResNet architecture trained on 2D images of the ventricular signal time traces (2D-ResNet) also performed very well (F2=0.906).

**Conclusion:** Artificial intelligence can adequately detect lead noise, optimizing remote monitoring and decreasing work burden.

**PO-618-06**

REMOTE PROGRAMMING OF CARDIAC IMPLANTABLE ELECTRONIC DEVICES: MULTI-CENTRIC EVALUATION OF A CUSTOM MULTIVENDOR SOLUTION

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**Background:** Until now, remote programming of cardiac implantable electronic devices (CIEDs) has been ruled out due to technical issues and safety concerns. However remote programming would be of high value particularly in settings of emergency, limited resources, enforced physical distancing, and quarantines.