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.

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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-esternal 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.