Score of 5, who was referred for routine post implant surveillance TEE. She had also completed 45 days of warfarin and ASA after implantation. A large DRT measuring 2 x 2 cm was noted. The patient was treated with warfarin and subsequently dabigatran with improvement in the size of thrombus on TEE. However, a gastrointestinal bleed led to the cessation of anticoagulation. Subsequent TEE demonstrated enlargement of massive DRT (3x2 cm). She was referred to cardiac surgery for thrombectomy and resection of the Watchman device and LAA. In both cases, the intraoperative findings demonstrates well-seated LAAC without gross findings of malapposition or peri-device leaks. The central screw was visible without evidence of endothelialization in both cases (Figure 1).

Conclusion: Incomplete endothelialization of the central screw with thrombus attachment was noted intraoperatively in both cases of massive DRT. Strategies or new designs to mitigate the risk of an exposed central screw as a possible nidus for thrombus formation may decrease the risk for DRT.

PO-620-05
ARRHYTHMIC EVENTS IN PATIENTS WITH CARDIAC IMPLANTABLE ELECTRONIC DEVICE POST COVID19 VACCINE
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Background: COVID19 is often associated with cardiac arrhythmia, and vaccination significantly reduces the risk of symptomatic disease, including arrhythmia. Vaccination is often accompanied by a flu-like syndrome and rarely, more serious side effects including cardiac involvement. We sought to investigate if vaccination with mRNA based COVID19 vaccine is associated with arrhythmic events recorded on cardiac implantable electronic devices (CIED).

Objective: To assess correlation between COVID19 vaccination and arrhythmic events among patients with CIED.

Methods: We adjudicated all arrhythmia alerts received in our institution between October 2020 and October 2021 in patients receiving a COVID19 vaccine (Moderna or Pfizer). For each patient, we compared the incidence of alerts in the 72 hours, 1 week and 2 weeks before and after the vaccination. In patients with multiple vaccination doses, each vaccination was treated separately. McNemar’s test was performed to measure the interaction between alerts and vaccination at different intervals.

Results: A total of 581 patients at a mean age of 70.6 were included, with 610 arrhythmic events. 440 patients were vaccinated, with 421 arrhythmic events. We found that 12 patients had arrhythmic events within 72 hours after vaccination, while only 3 patients had events in the 72 hours before vaccination, for a significant interaction between vaccination and arrhythmic events (p=0.03, OR 4.0 CI 1.079-22.088). The most common type of alert within 72 hours post vaccination was VT/VF, followed by AT/AF (Figure 1). Of those, 8 patients required an intervention including medication change (4/8), ICD shock/ATP therapy (3/8) and pacemaker implantation (1/8). There was no correlation between vaccination and arrhythmia at longer time intervals (20 vs 16 events before/after 7 days, p=0.61 and 31 vs 18 events before/after 14 days, p=0.083).

Conclusion: The development of mRNA based vaccine was critical in the efforts to mitigate the COVID19 pandemic, with countless lives saved and morbidity, including cardiovascular, prevented. In this work we found that mRNA based COVID19 vaccine was associated with arrhythmic events within 72 hours after vaccination. The implications of these events is yet to be clarified and a larger cohort is required to validate these results.

PO-620-06
VALIDATION OF RISK SCORE PREDICTING NEED FOR PACEMAKER IMPLANT AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT
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Background: The need for pacemaker is a common complication after TAVR. We previously described a risk score (Emory Risk Score, ERS) to predict the need for new pacemaker implant (PMI) after TAVR. Metrics included in the score are a history of syncope (1 point), pre-existing right bundle branch block (2 points), QRS duration $> 140$ ms (1 point), and prosthesis oversizing $> 16\%$ (1 point).

Objective: To prospectively validate the ERS among a separate cohort of patients undergoing TAVR.

Methods: We prospectively evaluated all patients without preexisting pacemakers or ICDs, nor pre-existing indications for pacing, and with available imaging data undergoing a first-time TAVR with a balloon-expandable TAVR prosthesis at our institution from March 2019 to December 2020 ($n = 556$). Patients were scored prospectively, however results were blinded from clinical decision making. The primary endpoint was PMI for high grade AV block within 30 days after TAVR. Performance of the ERS was evaluated using logistic regression, a calibration curve to prior performance, and receiver operating characteristic (ROC) analysis.

Results: The overall STS risk in the prospective cohort was lower than the original development cohort (3.4 ± 2.7 vs. 6.0 ± 4.2, $p < 0.001$). A total of 41 patients (7.4%) had PMI after TAVR. A higher ERS predicted an increased likelihood of PMI (Figure 1, OR 2.73 per point increase in score; 95% CI 2.08 - 3.56, $p < 0.0001$). There were relatively few patients in the ERS 4+ category, which may explain the apparent plateau in risk. There was good correlation between observed and expected values on the calibration curve (Figure 2). The area under the ROC curve was 0.804 (95%CI 0.725-0.883, $p < 0.0001$) demonstration very good discrimination for new pacemaker placement post TAVR.

Conclusion: The ERS prospectively predicted PMI for an indication of high grade AV block in a serial, real-world cohort of patients undergoing TAVR with a balloon-expandable prosthesis, confirming findings previously described in retrospective cohorts. Notably, despite being tested in a lower risk population, the prospective performance of the ERS was comparable to that in the cohort in which the score was developed. The ERS can serve as a clinical framework for pre-procedural risk stratification for the need for pacemaker after TAVR.

AN ENSEMBLE OF FEATURES BASED DEEP LEARNING NEURAL NETWORK FOR REDUCTION OF INAPPROPRIATE ATRIAL FIBRILLATION DETECTION IN IMPLANTABLE CARDIAC MONITORS

Shantanu Sarkar PhD

Background: Multiple studies have been reported for electrocardiogram (ECG) classification using deep learning neural networks. Most of these studies use the ECG as input to a convolution neural network (CNN) which then automatically generate features from the raw ECG signal.

Objective: To develop an application specific deep learning CNNs using custom ensemble of features to reduce inappropriate AF detections in implantable cardiac monitors (ICM).

Methods: The ensemble of features was developed and combined to form an input signal for deep learning CNN. The ensemble of features were designed based on the electrophysiological characteristics during AF: presence of fibrillation/flutter waves or absence of single p-wave between two R-waves, incoherence of RR intervals, and AF begetting more AF. A small custom CNN model using 6 convolution layers and the publicly available RESNET18 model were used. The deep learning models were trained and validated using more than 60K ICM detected AF episodes that were adjudicated to be true AF or false detections. The trained models were evaluated using an independent test dataset of ICM detected and adjudicated AF episodes from patients who were not included in the training and validation dataset.

Results: The training and validation dataset consisted of 31,768 true AF episodes (2516 patients) and 28,527 false episodes (2126 patients). The validation set used 20% of randomly chosen episodes of each type. The independent test set consisted of 4546 true AF episodes (418 patients) and 5384 false episodes (605 patients). In the validation set, the custom CNN had an area under ROC curve (AUC) of 0.996 (0.993 for RESNET18) and a threshold for discrimination was defined such that a relative sensitivity and specificity of 99.2% and 92.8% (99.2% and 87.9% for RESNET18) was obtained. The performance results for the two models in the independent test dataset for the pre-defined threshold is shown in the figure, with relative sensitivity and specificity of around 99% and 90% respectively.