catheter and the CARTO® navigation system (Biosense Webster, Inc.). A specialized imaging program was trained to quantify the overall % surface area represented by normal, intermediate, and low voltages as defined by corresponding color thresholds of 0.1 and 0.5mV. Medical records were reviewed for each patient to confirm AF type (paroxysmal vs. persistent), CHA²DS₂-VASc Score, and time from initial AF diagnosis to PVI.

**Results:** Overall PW voltages are shown in Fig. 1 for 358 ablation patients (45% paroxysmal, 55% persistent). Multiple linear regression (R²=0.24) identified persistent AF (p=3.2E-06), higher CHA²DS₂-VASc Score (p=3.6E-06, Fig 2) and greater time from initial AF diagnosis to PVI (p=0.007) as significantly predictive of the extent of PW low voltage areas. Age, gender, LV ejection fraction, LA volume, and LA volume index were not predictive. More extensive low voltages abnormalities were more common after 4 years following initial AF diagnosis.

**Conclusion:** We have developed a method to accurately quantify LA voltage distributions in patients undergoing AF ablation. The extent of PW low voltage abnormalities at index PVI is correlated with persistent AF type, longer history of AF, and higher CHA²DS₂-VASc Score. It will be important in the future to evaluate the effect the distribution of low voltage abnormalities has on ablation outcomes, as well as their temporal evolution and potential implications for ablation timing.
Background: Left atrial appendage occlusion, using intracardiac echocardiography (ICE) continues to evolve. One of the more recent advancements is the Siemens 4-D ACUSON AcuNav Volume ICE® (Siemens, Malvern PA). This catheter allows for 4D images to optimize the provider’s implant visibility and minimize the maneuvers required to assess the LAA. Although right atrial imaging has been more commonly described, left atrial 4-D ICE imaging may allow for better unobstructed imaging.

Objective: Demonstrate implant technique using 4-D ICE (ACUSON AcuNav Volume ICE®, Siemens, Malvern PA) guided LAOO using optimal left atrial imaging.

Methods: The 4-D ICE catheter is a 12.5 Fr catheter that is initially guided into the RA to assist in navigating transseptal puncture. The probe obtains a field of view which is 90 degrees by 50 degrees with frame rate of 16 volumes per second. The catheter visualizes the septum/fossa ovalis for transseptal puncture. Following successful puncture, the ICE catheter and LAOO Sheath can be guided through a single puncture with fluoroscopic and 4-D ICE guidance. Using multiplanar reconstruction, 4-D ICE requires a single catheter position to visualize the entirety of the left atrial appendage. We evaluate the mid left atrium with posterior flexion and counterclockwise rotation to visualize the LAA ostium. Multiplanar reconstruction can be manipulated to demonstrate the enface LAA ostium view the maximal length of the appendage. The landing zone dimensions are calculated using the reconstructions (Figure 1). Once the LAA has been appropriately visualized, the Watchman access sheath is advanced to the LA. Cineangiographic images of the LAA are obtained and the Watchman device is sized and delivered.

Results: Our single center experience has recorded more than 75 successful LAOO implants using this 4D ICE left atrial imaging technique. The advancement in visibility and ability to get a thorough assessment of the LAA, without complex manipulation of a 2-D ICE or TEE probe is ideal.

Conclusion: The evolution of ICE with 4-D technology has allowed for an improved imaging experience during implant, especially when imaging from within the left atrium.