Background: Left atrial appendage occlusion (LAAO) is a procedure that has been shown to be non-inferior to oral anticoagulation for stroke prevention for patients with atrial fibrillation. There is limited data about the safety of left atrial appendage occlusion (LAAO) in patients with heart failure (HF).

Objective: To evaluate LAAO safety and in-hospital outcomes in patients with HF.

Methods: We queried the NIS database from 2015-2018 for relevant ICD-9 and -10 procedural and diagnostic codes. We compared baseline characteristics and in-hospital outcomes of LAAC in patients with and without a history of HF. We used multivariate logistic regression to adjust for pre-specified covariates and possible confounders, p-value <0.001 was considered significant.

Results: We identified 14,751 patients with HF, and 23,923 without HF who underwent LAAO. Baseline characteristics are shown in Table 1. In-hospital mortality rate (0.5% vs 0.2%), acute kidney injury (AKI) (5.6% vs 2.3%), and all major bleeding (8.2% vs 6.1%) were significantly higher in the HF group compared to non-HF patients (p<0.001 for all). However, all-cause stroke, cardiac arrest, and intraoperative cardiac complications were not statistically different between groups. Additionally, HF conferred higher odds of mortality (OR 2.184 [95% CI 1.482-3.217]), AKI (OR 2.40 [95% CI 2.14-2.71]), major bleeding (OR 1.303 [95% CI 1.19-1.42]), and all transfusion (OR 1.8 [95% CI 1.58-2.05]).

Conclusion: Patients with HF have a higher risk of complications and mortality with LAAO compared to patients without HF, however the absolute rate of complications is low. Risks and benefits of LAAO should be discussed with patients with HF.

Table 1. Baseline characteristics of patients undergoing LAOO with and without HF.

| Variable          | HF (n=14751) | No HF (n=23923) | p-value |
|-------------------|--------------|----------------|---------|
| Age               |              |                |         |
| Female            |              |                | <0.001  |
| Race              |              |                | <0.001  |
| White             | 81% (11,952)| 84% (20,110)   |         |
| Non-White         | 19% (2,260) | 16.7% (3,055)  |         |
| Primary Payer     |              |                |         |
| Medicare          | 87.7% (12,938)| 87.3% (20,906)| <0.001  |
| Medicaid          | 1.7% (259)  | 1.0% (261)     |         |
| Private Insurance | 8.2% (1212) | 13.9% (3,343) |         |
| Self-pay          | 0.6% (91)   | 0.9% (222)     |         |
| No charge         | 0.1% (15)   | 0.1% (40)      |         |
| Other             | 1.3% (205)  | 2.0% (490)     |         |
| HTN               | 86.4% (12,747)| 80.7% (19,326)| <0.001  |
| BMI               | 41.5% (6059)| 30% (7199)     | <0.001  |
| Tobacco Use       | 40.9% (6034)| 35% (8390)     | <0.001  |
| Alcohol Use       | 1.4% (215)  | 0.91% (218)    | <0.001  |
| Prior Stroke      | 3% (450)    | 2.07% (496)    | <0.001  |
| HLD               | 60.5% (8355)| 57.3% (13719) |         |
| Obese             | 12.4% (1873)| 13.9% (3331)  |         |
| CAD               | 60% (9908)  | 41.3% (9888)   | <0.001  |
| PAD               | 9.14% (1,349)| 7.7% (1860)    | <0.001  |
| CVD               | 35% (5163)  | 35.3% (3609)   | <0.001  |
| COPD              | 22.7% (3536)| 12.4% (2975)   | <0.001  |
| Hx of MI           | 17.9% (2648)| 8.6% (2076)    | <0.001  |
| CHA2DS2VASC       | 4.5±1.1     | 3.0±1.1        | <0.001  |

Table 2. Clinical outcomes in patients undergoing LAOO with and without HF.

| Variable          | HF (n=14751) | No HF (n=23923) | p-value |
|-------------------|--------------|----------------|---------|
| Mortality         | 0.5% (70)    | 0.2% (55)      | <0.001  |
| Length of Stay    | 2.3±4 (5.5)  | 1.6±6 (3.13)   | <0.001  |
| Total Cost of Hospitalization | $127,877 | $114,081 | <0.001 |

Safety outcomes

| All-cause Stroke  | 0.8% (115)   | 0.7% (160)     | 0.020   |
| Cardiac-Arrest    | 0.29% (43)   | 0.16% (40)     | 0.012   |
| Intraoperative Cardiac Complication | 0.9% (134) | 0.6% (160) | 0.009 |
| All major bleeding| 8.2% (1216)| 6.1% (1469)    | 1.303 (1.19-1.42) | <0.001 |
| AKI               | 5.6% (820)   | 2.3% (552)     | 2.40 (2.14-2.71) | <0.001 |
| All Transfusion   | 4.2% (614)   | 2.3% (560)     | 1.8 (1.58-2.05)  | <0.001 |

Secondary outcomes

| Cardiogenic Shock | 0.7% (109) | 0.18% (45) | <0.001 |
| Cardioversion     | 1.0% (150) | 1.3% (137) | 0.007 |
| Pacemaker or ICD insertion | 0.9% (139) | 0.7% (139) | 0.002 |
| Ventricular Arrhythmia | 2.4% (393) | 0.95% (216) | <0.001 |

ROLE OF INTERATRIAL CONDUCTION IN ATRIAL FIBRILLATION. MECHANISTIC INSIGHTS FROM RENEWAL THEORY-BASED FIBRILLATORY DYNAMIC ANALYSIS

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Background: Inter-atrial conduction has been postulated to play an important role in atrial fibrillation (AF). The pathways involved in inter-atrial conduction during AF remain incompletely defined. A potential barrier in delineating the role of interatrial conduction in AF perpetuation has been that it has been challenging to physiologically probe these connections during sustained AF due to the turbulent nature of the fibrillatory process.

Objective: We recently showed a physiological assessment of fibrillatory dynamics could be performed using renewal theory, which determines rates of phase singularity formation ($l_f$) and destruction ($l_d$). Using the renewal approach, we aimed to understand the role of the inter-atrial septum and other electrically coupled regions during AF.

Methods: RENEWAL-AF is a prospective multicentre observational study recruiting AF ablation patients (ACTRN 12619001172190). We studied unipolar electrograms obtained from sixteen biatrial locations prior to ablation using a 16-electrode Advisor TM HD-Grid catheter. Renewal rate constants ($l_f$ and $l_d$) were calculated, and the relationships between these rate constants in regions of inter-atrial connectivity were examined.

Results: N=41 AF (29% females) patients were recruited. A positive linear correlation was observed between $l_f$ and $l_d$ (i) across the LA and ($l_f r^2 = 0.5, P<0.001, \lambda_d r^2 = 0.45, P<0.001$); and (ii) regions connected by Bachmann’s bundle (RAA-LAA $l_f r^2 = 0.29, P = 0.001; \lambda_d r^2 = 0.2, P = 0.008$). Paroxysmal AF showed stronger correlations across the LA and
RA septal region ($\lambda_d r^2 = 0.72, P < 0.001; \lambda_d r^2 = 0.79, P < 0.001$), than persistent AF ($\lambda_d r^2 = 0.17, P = 0.08; \lambda_d r^2 = 0.07, P = 0.28$). Similarly, there was a stronger correlation in patients with LA volume index (LAVi) < 40 mL/m$^3$. LAVi < 40 mL/m$^3$, $\lambda_d r^2 = 0.68, P < 0.001, \lambda_d r^2 = 0.68, P < 0.001, \lambda_d r^2 = 0.27, P = 0.03$ and $\lambda_d r^2 = 0.14, P = 0.14$.

**Conclusion:** Our findings support the role of interseptal statistically-determined electrical dysynchrony in sustaining AF. Additionally, renewal theory identified preferential conduction through inter-atrial pathways during fibrillation. These findings may be of clinical significance in identifying new targets for catheter ablation in AF patients.

**PO-641-07**

**PATIENTS WITH LONG QT SYNDROME HAVE A PRIMARY SINOATRIAL NODE PHENOTYPE OF INTRINSIC CHRONOTROPIC INSUFFICIENCY**

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**Background:** Long QT syndrome (LQTS) is a cardiac channelopathy characterized by QT prolongation and the potential for ventricular torsadogenic-mediated syncope, sudden cardiac arrest, and sudden cardiac death. Whether patients with LQTS have a primary sinoatrial node (SAN) phenotype of chronotropic insufficiency has been speculated but not demonstrated because of the confounding effects of beta blocker therapy.

**Objective:** To determine whether there is intrinsic chronotropic insufficiency present in untreated patients with LQTS.

**Methods:** A retrospective review of all treadmill exercise stress tests (TEST) was performed on patients with one of the three most common LQTS genotypes: LQT1, LQT2, and LQT3. For each patient, the first TEST completed while off beta blocker was analyzed. Patients with prior cardiac sympathetic denervation therapy were excluded. Chronotropic insufficiency was defined as having an age- and gender-predicted peak heart rate (HR) < 85% and/or a predicted HR reserve < 80%.

**Results:** Overall, 399 LQTS patients (197 LQT1, 73 LQT2, and 69 LQT3) were included (189 female [56%]; mean age at time of TEST [28 ± 17 years]). Mean predicted peak HR for all LQTS patients was 88% (range 54% - 119%) and mean predicted HR reserve was 79% (range 19% - 134%). Overall, half of all LQTS patients (n = 177; 52%) displayed chronotropic insufficiency, of which 129 with LQT1 (65%), 30 with LQT2 (41%), and 18 with LQT3 (26%). Patients with LQT1 were most likely to exhibit chronotropic insufficiency compared to patients with LQT2 ($p = 0.0006$) and LQT3 ($p = 0.0003$). There was no difference between patients with LQT2 and LQT3 ($p = 0.06$). Presence of chronotropic insufficiency was not a predictor of LQTS-associated symptoms.

**Conclusion:** Patients with LQTS, particularly LQT1, have an SAN phenotype of chronotropic insufficiency. If assessing beta blocker therapy effect by impact on peak HR, the patient’s pre-treatment peak HR, rather than an age- and gender- predicted maximum HR, should be used.