Low Voltage Areas in Left Atrium are Related to Delayed Invasive Care for Atrial Fibrillation

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Background

- Areas of low voltage electrograms (≤0.5 mV) (LVA) are known to correlate with areas of atrial fibrosis and are related to clinical outcomes after ablation.
- We hypothesized that delay in seeking invasive treatment is linked to larger LVA.

Methods

- Patients with AF who underwent posterior wall (PW) and pulmonary vein isolation ablation were included.
- Pre-ablation voltage map data was obtained from CARTO and LVA (0.05 to 0.5 mV) and extreme low voltage area (ELVA: ≤0.05 mV) were recorded.
- Percent ELVA or LVA was calculated by dividing the respective areas by total PW area.
- Time to ablation was defined as time from AF diagnosis to ablation.

Results

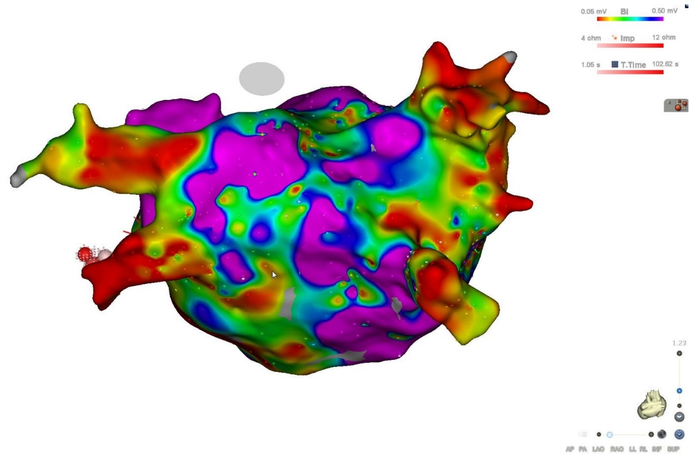

Figure 1. Voltage map of posterior wall demonstrating normal voltage in purple, low voltage in blue and extreme low voltage in red.

Table 1. Baseline characteristics (n = 65)

Characteristic	Value
Age (years)	67.43 ±8.27
Sex	
Male	60%
Female	40%
Co-morbidities	
Hypertension	72.31%
Diabetes	16.92%
CAD	23.08%
Heart failure	27.69%
LA area (cm^2)	333.24 ± 38.91
Mean duration of AF (months)	48.04 ± 46.46

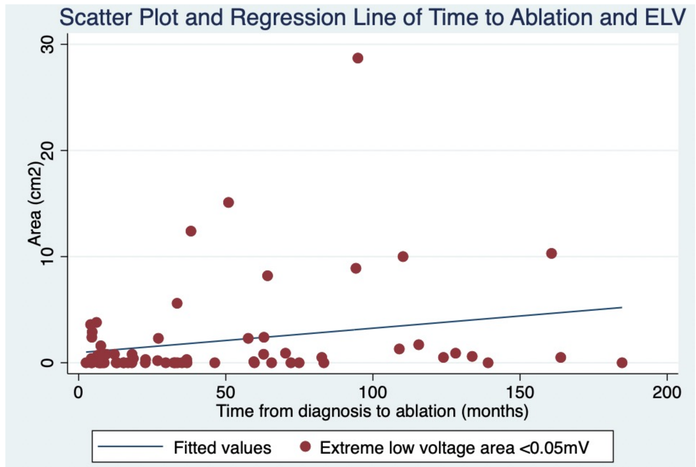

Table 2. Mean low voltage and extreme low voltage posterior wall areas by type of AF

Duration of AF (n = 65)	Mean posterior wall low voltage area (cm^2)		Mean percentage of posterior wall low voltage area (%)		Mean posterior wall extreme low voltage area (cm^2)		Mean percentage of posterior wall extreme low voltage area (%)	
Paroxysmal (14)	4.47		17.15		0.40		1.42	
Persistent (16)	6.52	$p = 0.12$	26.05	$p = 0.12$	0.61	$p = 0.04$	2.27	$p = 0.05$
Longstanding persistent (35)	9.34		34.10		3.38		11.37	

Results (cont.)

- ELVA occurred in 55.38% of patients and LVA occurred in 91.37% of patients.
- LVA was larger in longstanding persistent AF patients.
- ELVA and %ELV correlated with duration of AF.
- Univariate linear regression analysis demonstrated that longer time to ablation was associated with increased %ELVA (β = .292, p = .046).
- Mean LVA was greater in patients with 2-year recurrence compared to those without recurrence (10.85 ± 8.35 vs 6.57 ± 6.30 cm^2; t-test, p = .044).

Conclusions

- Low voltage areas correlate with duration of AF and higher recurrence rate after ablation for AF.

Next Steps

- Low voltage areas and AF recurrence will be evaluated against various socioeconomic factors including income level, race, and insurance status.