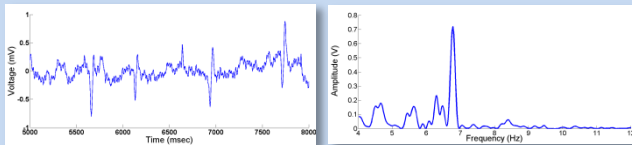


# Ablation for Persistent Atrial Fibrillation Shrinks Left Atrial High Dominant Frequency Areas

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## INTRODUCTION

The dominant frequency (DF) of atrial electrograms (EGMs) is believed to reflect atrial substrate with periodic activation responsible for the maintenance of persistent atrial fibrillation (persAF).



## OBJECTIVE

To assess whether ablation for persAF affected DF spatio-temporal behaviour using global simultaneous non-contact mapping.

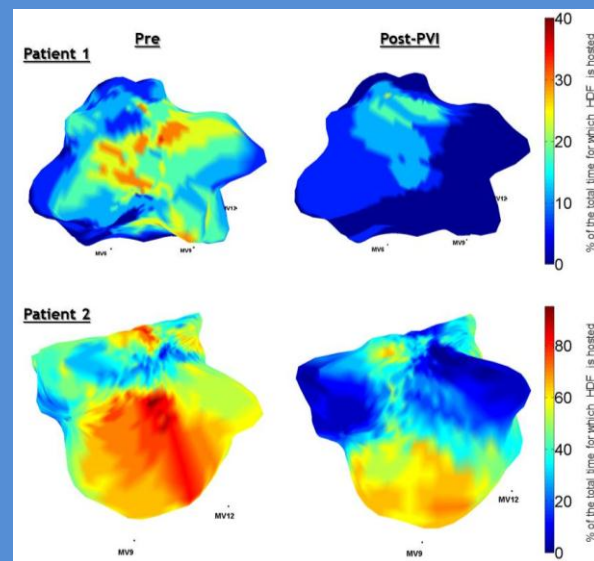
## METHODS

- 5 male persAF patients, age 37-57 years old, AF duration >9 months.
- Non-contact array catheter (EnSite Array, St. Jude Medical) was deployed in the left atrium to obtain 2048 virtual unipolar electrograms simultaneously
- Ventricular far-field influence cancellation in MATLAB (Mathworks, USA).
- Fast Fourier transform was then used to determine the DF for each EGM with a Hamming window.
- DF was defined within 4Hz to 10 Hz (4 s time window; 50% overlap; up to 38 s per patient).
- Highest DF (HDF) regions = calculated  $DF \pm 0.25\text{Hz}$  for each individual window and LA node.

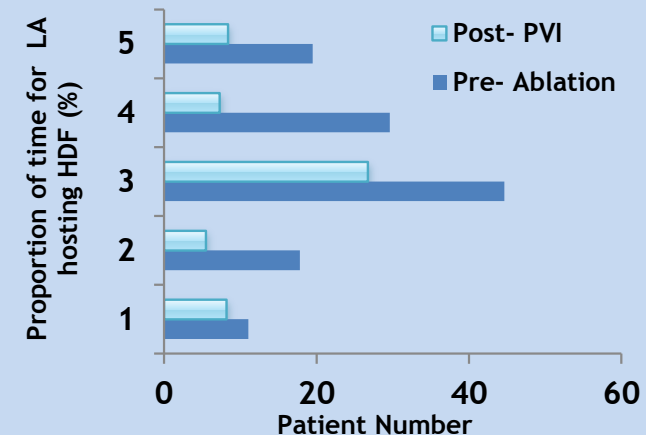
- The spatio-temporal behaviour of the HDF areas was studied by assessing the proportion of time for which each node was defined as a HDF region, and compared using the paired-samples t-test.

## RESULTS

Prior to ablation, considering all patients, an average of 24.5% of the LA was defined as an HDF area for any given time. This decreased significantly to 11.2% post Pulmonary Vein Isolation (PVI) ( $p < 0.001$ ). The figure represents the spatio-temporal distribution of HDF clouds on the 3D LA geometry seen in two patients, before and after ablation. The colorbar represents the percentage of the total time for which HDF is hosted at that node.



The table shows the change in the average proportion of the LA hosting HDF for each patient (pre- and post- ablation) per time window.



## CONCLUSIONS

PersAF ablation significantly reduces HDF spatio temporal coverage in the LA. This extends the findings of previous point-by-point ablation studies, and may support a DF-targeted ablation strategy using global simultaneous mapping for persAF.

## REFERENCES

- Computing in Science and Engineering. 2013; 15 (2): 87-79.
- Journal of Cardiovascular Electrophysiology. 2013; 25 (4): 371-9.