

Dominant Frequency Assessment during Atrial Fibrillation from Body Surface Mapping: Correlation with Intracardiac Basket Mapping

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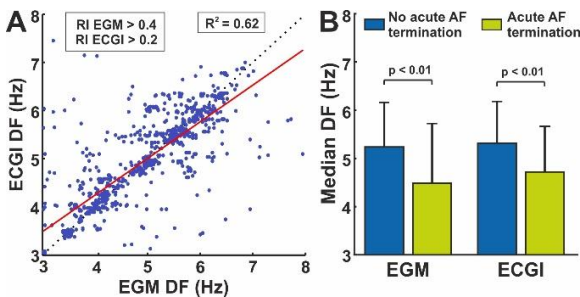
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Non-invasive characterization of the atrial activation rate during Atrial Fibrillation (AF) can help in guiding ablation procedures. This work presents the systematic comparison of non-invasive activation rate maps against intracardially-measured maps obtained by panoramic basket mapping.

Electrograms from 64-poles, bi-atrial basket recordings were collected on 47 AF patients simultaneously to torso surface potential recordings. Electrocardiographic Imaging (ECGI) signals were reconstructed using Tikhonov regularization and atrial activation rate was estimated by Dominant Frequency (DF) analysis in both endocardial and non-invasive recordings.

Individual comparison of endocardial and non-invasive DF measures presented an average deviation of 0.3 ± 0.5 Hz. Highest and median DF of each AF episode were non-invasively estimated with a deviation of 0.5 ± 0.8 Hz and 0.4 ± 0.6 Hz respectively. These non-invasive clinical measures served as estimator of the acute ablation success ($p=0.001$) in the same trend as intracardiac DF maps, having lower activation frequencies those patients in which the ablation procedure successfully terminated AF.

ECGI mapping provides clinically useful DF maps during AF, compared with panoramic endocardial recordings. Non-invasive DF can identify the faster regions and provide an insight of the success of the ablation procedure.



A. Correlation between basket and non-invasive DF measures: DF measures at EGM vs ECGI. B. Clinical DF measures vs acute ablation outcome: median DF on patients in which ablation terminated or did not terminate AF.