

The Suggested Electrode Number in Electrocardiographic Imaging for Identifying Atrial Fibrillation Drivers

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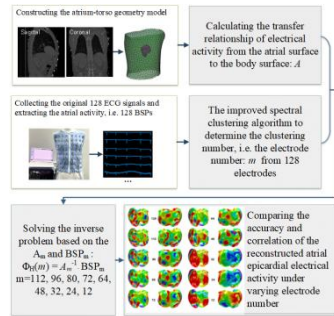
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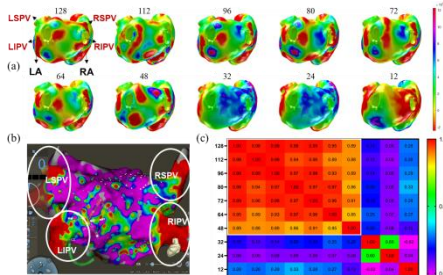
Electrocardiographic imaging (ECGI) is expected to map the epicardial potential non-invasively and globally and identify the atrial fibrillation (AF) drivers. There is currently no uniform standard in ECGI for the selection of the ideal electrode number on the body surface.

From the original 128 surface electrodes we selected out 112, 96, 80, 72, 64, 48, 32, 24, and 12 electrodes using an enhanced spectral clustering approach.

6 paroxysmal and 4 persistent AF patients were enrolled in the study. By examining the relevance and correctness of atrial epicardial electrical activity reconstructed by the ECGI under varying



The whole research flow



An instance of paroxysmal AF patient: (a) Atrial surface potential map reconstructed by ECGI under different numbers of electrodes; (b) The voltage map from the Carto 3 system (intracardiac catheter mapping); (c) The correlation coefficient between epicardial potentials reconstructed by ECGI under different electrode numbers.

numbers of body surface electrodes, the suggested minimum numbers of electrodes for paroxysmal and persistent AF are identified, respectively.

For persistent AF, it is recommended that the minimum number of electrodes be greater than 48 (such as 64 and above); for paroxysmal AF, when the minimum number of electrodes is 48, the reconstructed potential map can maintain a high similarity with the potential maps obtained by ECGI with higher number of electrodes.