**SIMULTANEOUS ENDOCARDIAL-EPICARDIAL PHASE MAPPING IN HUMAN PERSISTENT ATRIAL FIBRILLATION**

(A) Intraoperative photograph of simultaneous epicardial and endocardial AF mapping in the RA lateral wall using two HD grid catheters (*endocardial grid, * epicardial grid); RAA: right atrial appendage, RV: right ventricle. (B) Phase mapping showing increased dispersion of signal phase between the epicardial and endocardial surfaces. (C) Wavefront patterns with marked heterogeneity between endocardium and epicardium: Single wavefronts (i), Multiple wavefronts on epicardium with wavefront collision (ii) (iii), Endocardial counter-clockwise rotor with disorganized activity on epicardium (iii), Epicardial counter-clockwise rotor with multiple wavefront on endocardium (iv).

14 patients
2-min AF mapped/patient
- Mean Age: 64.5±4.8yrs
- Mean LA volume indexed: 55±19.7 ml/m²
- Mean Duration of AF 18.2±11 months
- 57.1% (8/14) valvular
  - 6/8 mitral
  - 1/8 aortic
  - 1/8 tricuspid
- 42.9% (6/14) ischemic

(C) PHASE MAPPING: WAVEFRONT PATTERNS

(i) SINGLE WAVEFRONT  
(ii) MULTIPLE WAVEFRONT  
(iii) ENDOCARDIAL ROTOR  
(iv) EPICARDIAL ROTOR