Due to the anatomic and the functional interatrial relationship, AF is a biatrial process. Whether one of the atria could sustain AF is not known. This study included 11 patients (mean age 57 +/- 10 years, 7 men) with AF who showed a distinct activation pattern, characterized by regular activity in the right atrium (RA) and irregular fibrillatory activity confined to the left atrium (LA) throughout the AF episodes. Each of the atria was mapped with 64-electrode basket catheters. AF was monitored for 74 +/- 26 minutes. Complex and irregular activity with a cycle length of 138 +/- 43 ms was observed in the LA throughout the monitoring time. The posterior and the roof of the LA showed the highest degree of disorganization. RA was activated by regular wavefronts with a cycle length of 194 +/- 22 ms (P< 0.001, compared with LA). No fibrillatory activity was observed in the RA. All wavefronts that activated the RA were of septal origin: high anteroseptal 52%, low posteroseptal 22%, mid-septal 18, and dual wavefronts (from the high anteroseptal and low posteroseptal pathways) 8%. The lateral wall of the RA was activated in a superoinferior direction in 82% of all activations. A left-to-right conduction block during AF and a rotor of fibrillatory activity located in the posterior wall of the LA were observed in two patients. Isolated AF in the LA showed various surface electrocardiographic patterns.
It is concluded that LA alone without participation of the RA can sustain AF. These data have implications for mechanisms and the ablative therapy of AF.