A novel technology for mapping the left ventricle (LV) has been derived from a new diagnostic and guidance-navigational system (Biosense). This system uses a low-intensity magnetic field energy source and sensor-tipped catheters to locate catheter position in 3D space and reconstructs online, color-coded electromechanical maps of the LV without using fluoroscopy. Such a system has been used in the electrophysiology field to diagnose, locate, and treat arrhythmogenic foci. This system also allows distinction of normal from infarcted or ischemic myocardium, based on intracardiac recording of voltage potentials, and the mechanical map can provide global and regional LV contractility data.

We used the Biosense system to map the LV of a 75-year-old woman with chronic refractory angina pectoris and no previous myocardial infarction. She did, however, have prior coronary bypass surgery and currently has reversible inferior and posterolateral perfusion defects in nuclear imaging study. Figures 1 and 2 present right and left anterior oblique LV projections, respectively. Panels A are electroanatomic maps showing a normal pattern of intracardiac electrical activation sequence ranging from $-35 \text{ ms}$ (color-coded as red) in the septal zone to $+10 \text{ ms}$ (blue-purple) in the posterolateral area. Panels B are voltage maps (unipolar recording) showing high ($>25 \text{ mV}$) voltage potentials (blue-purple) through the LV, except for a zone of physiological reduced voltage ($<10 \text{ mV}$, red) in the mitral annulus (1B, arrow). Panels C are local shortening maps detecting the extent of LV contractility, with an extensive hypokinetic zone (local shortening $<6\%$, red) in the inferior and posterolateral walls (arrows). A mechanical impairment (C) within an area of intact electrical activity (B) represents an electromechanical dissociation, most likely due to severe chronic ischemia or hibernating myocardium, as shown in this example.
Left Ventricular Electromechanical Mapping of Myocardial Ischemia
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