

Development of a Swine Model of Left Bundle Branch Block for Experimental Studies of Cardiac Resynchronization Therapy

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Abstract

Animal models that mimic human electrical and mechanical dyssynchrony often associated with chronic heart failure would provide an essential tool to investigate factors influencing response to cardiac resynchronization therapy. A standardized closed-chest porcine model of left bundle branch block (LBBB) was developed using 16 pigs. Radiofrequency applications were performed to induce LBBB, which was confirmed by QRS widening, a surface electrocardiogram pattern concordant with LBBB, and a prolonged activation time from endocardial. Echocardiography confirmed abnormal motion of the septum, which was not present at the baseline echocardiogram. High susceptibility of pigs to ventricular fibrillation during the endocardial ablation was overcome by applying high-rate pacing during radiofrequency applications. This is the first study to devise a closed-chest porcine model of LBBB that closely reproduces abnormalities found in patients with electrical and mechanical cardiac dyssynchrony, and provides a useful tool to investigate the basic mechanisms underlying cardiac resynchronization therapy benefits in heart failure..

Keywords

Experimental study, Porcine model, Left bundle branch block, Cardiac resynchronization therapy, Cardiac dyssynchrony.