

Novel extrapericardial approach for implantable cardioverter defibrillator

Madjarov J. M

Sanger Heart & Vascular Institute Cardiothoracic Surgery Kenilworth, USA



Abstract

The number of patients who meet the criteria for an implantable cardioverter defibrillator (ICD) has significantly increased over the past decade. Transvenous leads have become the procedure of choice. However, many patients who may benefit from ICD therapy are not candidates for a transvenous device. The purpose of this study was to evaluate ICD implantation using extrapericardial leads with a minimally invasive approach as a proof of concept. Yorkshire pigs (n=9) were anesthetized and mechanically ventilated. All animals were divided into two groups: group 1 included healthy animals that went through ICD implantation, and group 2 included ICD implantation after induction of acute myocardial infarction. A bipolar defibrillation lead was introduced using minimally invasive assistance. The distal coil was attached to the soft tissue on the pericardium at the level of the left ventricle. The proximal coil was secured over the right ventricle without opening the pericardium. Defibrillation testing was successful in all animals using standard configurations and energy delivery of 27 to 37 J. There were no significant differences between defibrillation threshold (DFT) values in both groups. The mean impedance just before the first shock was 1,030 ohms in the first group and 1154 ohms in the second group. After that, the mean impedance gradually decreased regardless of further defibrillation shocks. The final mean impedance was 877 ohms and 935 ohms in the first and second groups, respectively. There was no increase in impedance between the coil and generator and no inappropriate discharges. Successful defibrillation was achieved in all animals. There were no complications related to surgery or device placement. Based on our data, we conclude that extrapericardial ICD placement is a feasible approach that may be a valuable alternative or adjunct to current defibrillator lead systems.

Biography

JekoMadjarov, is board-certified in general, vascular/endovascular, and cardiothoracic surgery in the United States. His clinical interests include adult cardiac and thoracic surgery; aortic surgery, including complex/endovascular aortic repair; and minimally invasive coronary and thoracic surgery. He is a key member of the complex lead extraction program in the department of cardiac electrophysiology. Dr. Madjarov has several patents in the field of diagnosis and treatment of cardiac arrhythmias, endovascular treatment of aortic disease, and complex chest wall reconstruction. An active inventor, Dr Madjarov is leading several research studies and is also closely involved in the development of new. He has authored more than 20 publications in peer-review.