

Single versus dual chamber implantable cardioverter defibrillator for the avoidance of inappropriate shocks - results from the OPTION trial

Christof Kolb*

German Heart Centre of the State of Bavaria and the Technical University Munich, Munich, Germany

Introduction: Implantable Cardioverter Defibrillators (ICD) are considered to be the treatment of choice for primary and secondary prevention of sudden cardiac death. However, the therapy is burdened by inappropriate ICD shocks (for example for supraventricular tachyarrhythmias) which reduce patient's quality of life and acceptance of the device, although dual chamber (DC) ICD have access to atrial and ventricular information for tachyarrhythmia discrimination. Recent studies have failed to show a clear benefit in reducing inappropriate shocks by these devices¹⁻³. But adequately powered trials with a long-term follow-up are scarce.

Methods: Patients (pts) were recruited in 54 international centres and supplied with a DC ICD. A total of 453 pts were randomised to receive either standard SC programming or optimised DC programming⁴. Optimised DC programming was defined by the activation of the discrimination algorithm (PARAD+) and a mode (SafeR) to minimise ventricular pacing (Vp). ICD indications were primary (75%) or secondary (25%) prevention of sudden cardiac death; pts were aged 63±11 years (86% males). For the both groups, zones of arrhythmia detection were set with the following inferior cut-

offs: VF 240; Fast VT 200; VT 170; slow VT 120 bpm. ATP and/or shock therapies were recommended to be activated in all these zones. Pts' outcome measures were the occurrence of inappropriate shocks, all-cause mortality and cardiovascular morbidity.

Results: During an average follow-up (FU) of 23±8 months, DC ICD-therapy, as compared to SC ICD-therapy, was associated with significantly fewer pts experiencing inappropriate shocks (10/230 pts=4.3% vs. 23/223 pts=10.3%; p=0.0146) and longer time to first occurrence of inappropriate shock (p=0.0122 in Kaplan Meier analysis). Comparing DC- and SC ICD-therapy referring to mortality or cardiovascular events statistical equivalence was reached (p<0.0001), with similar rates in the sub-items of all cause deaths (21/230 pts=9 % vs. 18/223 pts=8%) and cardiovascular events (33/230 pts=14% vs. 40/223 pts=18%).

Conclusion: DC-therapy with optimized arrhythmia discrimination and minimised Vp, as compared to standard SC-therapy, was associated with a significantly lower occurrence of inappropriate shocks over the 2 years follow up. This benefit was reached with an equivalent rate of all-cause mortality and cardiovascular events.

KEYWORDS: arrhythmia discrimination, inappropriate shocks, implantable cardioverter defibrillator, pacing, shock, survival, tachyarrhythmias.

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*Address for correspondence: Deutsches Herzzentrum München, Klinik für Herz- und Kreislauferkrankungen, Lazarettstr. 36, DE-80636 München, Germany.

Phone: +49-89-1218-2020

Fax: +49-89-1218-4593

E-mail: kolb@dhm.mhn.de

Literature

1. Deisenhofer I, Kolb C, Ndrepepa G, et al. Do current dual chamber cardioverter defibrillators have advantages over conventional single chamber cardioverter defibrillators in reducing inappropriate therapies? A randomized, prospective study. *J Cardiovasc Electrophysiol.* 2001;12:134-42.
2. Theuns DA, Klootwijk AP, Goedhart DM, Jordaens LJ. Prevention of inappropriate therapy in implantable cardioverter-defibrillators: results of a prospective, randomized study of tachyarrhythmia detection algorithms. *J Am Coll Cardiol.* 2004;44:2362-7.
3. Friedman PA, McClelland RL, Bamlet WR, et al. Dual-chamber versus single-chamber detection enhancements for implantable defibrillator rhythm diagnosis: the Detect SupraVentricular Tachycardia study. *Circulation.* 2006;113:2871-9.
4. Kolb C, Tzeis S, Sturmer M, et al. Rationale and design of the OPTION-study: optimal antitachycardia therapy in ICD patients without pacing indications. *Pacing Clin Electrophysiol.* 2010;33:141-8.