

16:00 - 17:30 S25 - Electrophysiology and Pacing

Hall D

Chairs: **M. Eldar**
A. Militianu

- 16:00 **Long Term Outcomes of VDD Mode Pacing in Patients with Atrioventricular Block**
M. Blich, M. Suleiman, T. Zeidan Shwiri, I. Marai, M. Boulos, S. Amikam
Haifa
- 16:15 **The Impact of Combined Resynchronization and Implantable Defibrillator Therapy on Mortality in Patients with Narrow QRS vs. Wide QRS Complex**
M. Palombo^{1,2}, A. shiyovich^{1,2}, A. katz^{1,2}, Y. Plakht², V. Khazan¹, S. Cohen¹, D. Ben Shuhsan², V. Khalameizer¹
¹ Ashkelon, ² Beer-Sheva
- 16:30 **Automatic Surface ECG-Based Analysis of Atrial Electrical Activity / Refractoriness – The Rodent Model**
Y. Zigel¹, M. Mor¹, A. Katz^{1,2}, V. Zviling¹, G. Ofer¹, Y. Etzion¹
¹ Beer-Sheva, ² Ashkelon
- 16:45 **Long-term Follow-up of Selectsecure Lead at Atrial and Ventricular Position**
S. Rosenheck, A. Weiss, Z. Sharon
Jerusalem
- 17:00 **"Omega-3 Index" In Israeli Post-MI ICD Recipients – Baseline Results From PUFA-ICD RCT.**
A. Laish-Farkash^{1,2}, D. Weisman¹, N. Koren-Morag¹, U. Goldbourt¹, E. Schwammenthal^{1,2}, M. Eldar^{1,2}, M. Glikson^{1,2}, D. Luria^{1,2}
¹ Ramat-Gan, ² Ramat-Aviv
- 17:15 **Influence of Obstructive Sleep Apnea on Nocturnal Ventricular Arrhythmias in Patients with Automatic Implantable Cardioverter Defibrillators**
K. Atalla, T. Zeidan Shwiri, I. Marai, M. Suleiman, M. Blich, M. Boulos
Haifa

Long Term Outcomes of VDD Mode Pacing in Patients with Atrioventricular Block

Miry Blich, Mahmoud Suleiman, Tawfiq Zeidan Shwiri, Ibrahim Marai, Monther Boulos, Shlomo Amikam

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Background: Current guidelines suggest the use of VDD pacemakers in patients with Atrioventricular (AV) block and normal sinus node function. However the possibilities of long term loss of atrial sensing, occurrence of permanent atrial fibrillation (AF) or late appearance of sinus node dysfunction (SND) make VDD mode being used much less than expected. The objectives of our study were to evaluate the efficacy and stability of VDD pacing in long term follow up and to find risk factors for the loss of VDD mode.

Methods: We retrospectively evaluated all patients with VDD pacemakers who were implanted in our center between 1995 and 2007 regarding atrial sensing, incidence of AF or sustained bradycardia and survival of VDD mode.

Results: During the study period, 123 consecutive patients with AV block (51% men, age 62 ± 17.8 years) received a VDD pacemaker for various degrees of AV block (third degree 63%, second degree 34% and first degree 3%). Mean follow up duration was 54.6 ± 39.2 months. At the last follow up visit, 76 pacemakers (78%) remained in VDD mode. Twenty-one patients (22%) lost their original VDD mode and were programmed to VVIR (undersensing, 11; chronic AF, 7; SND, 3). Chronic sensed p wave amplitude was significantly lower than the implant p wave (by 57%). In 30 patients (32%) VDD mode was restored or maintained by increasing atrial sensitivity. No episodes of atrial oversensing were observed. Age older than 75 years ($p=0.001$) and history of paroxysmal AF ($p=0.0001$) before the implantation as p wave lower than 1 mv during the follow up ($p=0.02$) were found as risk factors to lose VDD mode during the follow up.

Conclusions: VDD pacing has good long term performance. Age less than 75 years and absence of paroxysmal AF history, at implantation predict maintenance of VDD pacing mode. Close p wave amplitude check-up should be done routinely. Taking into account that no atrial oversensing was observed our recommendation is to increase atrial sensitivity when P wave amplitude declines to less than 1 mv, thus minimizing intermittent or long term atrial undersensing and loss of VDD mode pacing.

The Impact of Combined Resynchronization and Implantable Defibrillator Therapy on Mortality in Patients with Narrow QRS vs. Wide QRS Complex

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Background – Combined cardiac resynchronization therapy (CRT) and implantable defibrillator (ICD) therapy reduced all cause mortality in patients with systolic heart failure and wide QRS. Conflicting data exist regarding the effects of ICD-CRT on mortality in patients with narrow QRS.

Objective - To evaluate the impact of combined ICD-CRT implantation in patient with systolic heart failure on all cause mortality, comparing patients with narrow QRS and wide QRS.

Methods - The medical records of all patients who underwent an ICD-CRT implantation in Barzilai Medical Center between 06/2005 -12/2007 were reviewed. Narrow QRS was defined as < 120 msec and wide QRS ≥ 120 msec. Mortality data were collected until 11/2008. Survival curves were constructed by the Kaplan Meier method and compared by the log-rank (Cox-Mantel) test.

Results – A total of 161 pts. qualified for this study, mean age 67.2 ± 9.3 years, 79% male; 69 (43%) with a narrow QRS and 92 (57%) with a wide QRS; Mean EF $23.5\% \pm 7\%$; Mean NYHA FC = 3 ± 0.5 . Median follow up was 20 months. Overall 20 pts (12%) died, 13 (15%) with wide QRS, and 7(10%) with narrow QRS. Pts with wide QRS were older than those with narrow QRS [68.49 ± 7.99 vs. 64.17 ± 10.42 , respectively ($p=0.005$)], otherwise the two groups were similar. One year mortality rate was higher in pts with wide QRS compared to pts with narrow QRS (13% vs. 4% respectively, $p=0.06$). However, three year mortality rates were similar in the two groups (14% vs. 10% respectively, $p=0.42$).

Conclusions – One year mortality rate seems to be lower in pts with narrow QRS compared to those with wide QRS following ICD-CRT implantation. This difference is not maintained after 3 years.

Automatic Surface ECG-Based Analysis of Atrial Electrical Activity / Refractoriness – The Rodent Model

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BACKGROUND: The inability to detect atrial electrical activity limits the progression in tachycardia research and clinical applications in animal models and human. In the recent years rodents, including genetically altered mice, have become invaluable tools for studying cardiac arrhythmias. However, studies of atrial electrophysiology (EP) are challenging and EP parameters are hard to determine in rodents. Recently, our group published a first technique to consistently obtain atrial EP parameters of rodents. However, it necessitates equipment and skills that are not generally available. In the present study, using our experimental data as gold standard, we designed an algorithm to detect atrial electrical activity and refractoriness of rodents based on the surface ECG signal.

METHODS AND RESULTS: We analyzed ECG signals from 9 rats containing an average of 28 S1-S2 testing protocols with varying S1-S2 intervals. Out of 250 S1-S2 tests, S2 induced atrial activity existed in 167 and failed in 83 cases. The existence of atrial activity correlated well with the interval between the QRS complex triggered by the last S1 and the next QRS complex (RR_{S2}). Comparing RR_{S2} to the spontaneous RR interval (RR') we found three decision-relevant ranges that correlate with the electrophysiology: $RR_{S2} < 1.02RR'$ indicated existing atrial activity followed by AV conduction. $RR_{S2} > 1.1RR'$ indicated existing atrial activity followed failure of AV conduction. RR_{S2} between these values indicated failure of the atrial activity. This algorithm reached very accurate detection results (sensitivity of 94.2%, specificity of 98.7%).

CONCLUSION: Detection of rodent atrial electrical activity and refractoriness is feasible based on a simple ECG based algorithm. This tool should advance the ability to gain data on the AERP of rodents using a rather simple experimental setting. This algorithm may be applied in human research and clinical use.

Long-term Follow-up of Selectsecure Lead at Atrial and Ventricular Position

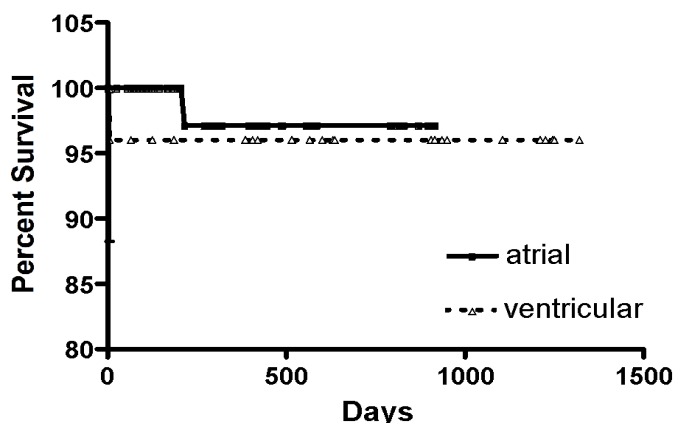
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Background: During 2005 a 4 French lumen less silicon coated pacing lead (Medtronic Selectsecure 3830) was clinically released. No data on long-term survival of this lead is available. The purpose of this study was to evaluate the long-term survival of Selectsecure lead at atrial and ventricular position.

Methods: Between November 2005 and November 2008, 761 patients had pacemaker implantation at Hadassah Hebrew University Medical Center, and 81 received Selectsecure lead: 58 at atrial position, 24 at ventricular position and 2 at both atrial and ventricular position. The atrial site was usually the lateral wall, except in one patient the posterior septum that was the only site with acceptable pacing parameters. The ventricular site was usually the outflow septum except in two patients when the apex was selected. The implant included a steerable guiding catheter insertion, location of the tip at the desired location (0.5-3 cm apart) and fixation of the lead by 2.5 clockwise rotations of the whole lead.

Results: During 499 ± 352 days there was only one atrial and one ventricular dislocation. The figure presents the survival curve at both sites.



$p=0.6410$

The curves are comparable and even better than any other active fixation leads at both positions. The lead can be located at any site in the right atrium and ventricle.

Conclusions: The long-term performance of Selectsecure lead is excellent and comparable or superior to other previous active fixation leads. The lead can be placed at any atrial or ventricular site. The small size may prevent future complications.

"Omega-3 Index" In Israeli Post-MI ICD Recipients – Baseline Results From PUFA-ICD RCT.

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Background: Total % content of EPA and DHA acids in red blood cell, the "Omega-3 Index", was recently introduced as a CHD risk predictor. Its relationship with arrhythmias is still controversial.

Objective: To examine the association between baseline Omega-3 Index and ventricular arrhythmias in post MI ICD patients.

Methods: 82 post-MI patients (mean age 67±9 range 41-89, 93% male) with ICD (53% dual-chamber, 18% bi-ventricular) were included in a randomized controlled trial of the effect of PUFA supplement on arrhythmias. While the study is still ongoing, we report here the analysis of ventricular arrhythmias stored by the ICDs over the last six months prior to enrollment as related to the baseline Omega-3 Index in 48 of the study patients.

Results: Mean baseline Omega-3 index (N=48) was 4.3% ± 2.6 (range: 0.1-11.82%). Over the 6 month period 10 patients (21%) experienced sustained VT/VF (terminated with ATP or shock) and 13 patients (27%) experienced nonsustained VT.

Mean Omega-3 Index was similar (4.46 ± 3.2 vs. 4.15 ± 2.5 (p=0.748)) in patients with vs. patients without sustained VT/VF respectively. There was lower mean Omega-3 Index in patients with any ventricular arrhythmia (sustained or nonsustained) than in patients without any ventricular arrhythmia (3.63±3.0 vs. 4.53± 2.4, P = 0.26).

Conclusion: In this study Omega-3 Index was not found to be significantly different in post MI ICD patients with and without ventricular arrhythmias. These observations will need to be tested in larger cohorts of post MI patients.

Influence of Obstructive Sleep Apnea on Nocturnal Ventricular Arrhythmias in Patients with Automatic Implantable Cardioverter Defibrillators

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Background: Patients with implantable cardioverter defibrillators (ICDs) continue to suffer from ventricular arrhythmias that are associated with significant morbidity. Obstructive sleep apnea (OSA) results in recurrent intermittent hypoxia and sympathetic nervous system activity surges which provide the milieu for cardiac arrhythmia development. We postulate that the prevalence of nocturnal clinically significant ventricular arrhythmias is higher among patients with automated implantable cardioverter defibrillators (AICD) and OSA.

Methods: We prospectively studied 21 patients with AICD. The presence of OSA was determined by overnight polysomnography. Obstructive apneas and hypopneas were classified according to standard criteria. An apnea-hypopnea index (AHI) >10 established the diagnosis of OSA. ICD interrogation was used to determine the type and time of onset of clinically significant ventricular arrhythmia (non-sustained VT, sustained VT and VF) in each patient.

Results: Using the threshold of AHI >10 events/h, OSA was present in 13 patients (61.9%). There was a trend toward higher episodes of ventricular arrhythmias in patients with OSA (mean 1.6 ± 1.7 vs. 0.6 ± 1.2 per patient, $P = 0.09$). However, the higher number of ventricular arrhythmias in patients with OSA was solely due to a significant increase in ventricular arrhythmias occurring between midnight and 6 AM (0.8 ± 1.0 vs. 0.3 ± 0.7 , $P=0.04$).

Conclusion: The results of this small study indicate that patients with OSA have a higher frequency of clinically relevant ventricular arrhythmias during the night.