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Renal Failure after CRT Implantation

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Background: Renal failure is a potential complication of CRT implantation. There is lack of data about CRT implantation and risk of subsequent renal failure.
Objectives: The aim of the present study was to assess the change in renal function in patients with heart failure with or without concomitant renal failure who underwent cardiac resynchronization therapy (CRT) implantation.
Methods: A retrospective study of patients (n= 178) who had undergone CRT implantation in a single center between 2004-2008. We analyzed renal function (urea/creatinine and GFR- using the modification of diet in renal disease formula (MDRD) formula prior to, 1 week and 6 months after CRT implantation.
Results: Creatinine levels and GFR did not change significantly from baseline (Cr 1.35 ± 0.56 , GFR58 (44; 77)) to 6 months(Cr -1.41±0.64, GFR- 45 (39;54)) in patients with creatinine levels above 2 mg/dl at baseline creatinine levels dropped significantly from 2.34±0.32 to 2.02±0.40 (p=0.001) at 1 week and to 2.15±0.43 after 6 months (p=0. 047). Furthermore GFR in this group increased from 31 (24; 33) to 36 (29; 43) (p=0.035) at 1 week and to 34 (28; 39) at months (p=0.15).
Conclusions: According to our data renal function did not deteriorate in patients with renal failure who underwent CRT implantation; in fact we observed an improvement of creatinine levels and GFR s soon after the procedure that was sustained even after 6 months. Renal failure and concern of worsening renal function should not prevent implementation of CRT therapy in patients with renal failure.

Multisite Left Ventricular Endocardial Pacing - A Single Center Experience

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Background: Multisite cardiac resynchronization therapy (MSCRT)- i.e. two pacing leads on LV- has theoretical advantages over conventional CRT in faster and more physiological LV activation. The indications and long term results are not well defined.
Aim: To summarize our experience in implantation of MSCRT.
Methods: Revision of all patients implanted with MSCRT during 2008-2011 in Barzilai MC. Indications, ECG, location of leads, complications and long term results were analyzed.
Results: Thirteen patients, age 61±10 y, 77% male, were implanted initially with MSCRT (not an upgrade from CRT). None had procedure related complications. All LV leads were connected via bipolar connector to LV port and paced bipolar. Indications were: 1) severe TR, AF, normal EF and HF NYHA III-IV (n=2). MSCRT-P was implanted before total AVJ ablation to avoid RV P/S lead implantation prior to TV surgery. During follow-up (f/u) of 23 and 41 m, FC improved to I-II with stable EF and deferral of surgery. 2) EF<20%, NYHA III-IV and recurrent VT storms despite ablations and AAD (n=2, MSCRT-D). F/u of 11 m showed no VT episodes and NYHA II in both. 3) EF 15%, NYHA IV and LBBB>150ms (n=3, MSCRT-D). One had drastic improvement, until death 13 m later from VF; one had died one day post implantation from HF exacerbation; and one had f/u < 1 m. 4) EF<30%, NYHA≥III and narrow QRS or RBBB (n=6, MSCRT-D). Three had symptomatic improvement during f/u of 5-19 m. The others had < 1 m f/u. LV leads location (CS branch): LV1- postero-lateral (n=8), posterior (3), and lateral (2). LV2- antero-lateral (n=8), anterior (4) and posterior (1).
Conclusions: MSCRT is feasible, safe and valuable in selected patients. Probable indications are: severe TR with severe HF - for symptomatic relief before TV surgery; incessant VT that has no ablative solution; end-stage HF with very wide QRS; and severe HF with narrow QRS / RBBB. Randomized controlled studies are required.

Wheter LV Lead Position and Distance between LV and RV Influence on Outcomes of Patients with CRT?

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Background: The aim of this study was to analyze the impact of the LV lead position and the distance between LV and RV electrodes on outcome in patients with cardiac resynchronization therapy (CRT).
Methods: A retrospective cohort analysis of 207 consecutive patients that were implanted CRT between January 2005 and January 2009. The location of the LV lead was assessed by chest x-rays at the time of device implantation. The LV lead location was classified along the lateral view into an anterior and a posterior position and along the antero-posterior view into a basal, midventricular, and inferior. The primary end point was two year mortality. Secondary end-point was complication rate after CRT implantation.
Results: Basal LV lead position on antero-posterior view was less common and found in 9.6% of patients while midventricular and inferior positions were noted in 45.2% of cases. Anterior lead position on lateral view was noted more frequently than posterior lead position 53.4 vs. 46.6% of cases. There were similar two year mortality rates in basal (21.4%), midventricular (22.4 %) and inferior (17.6 %) LV lead positions on antero-posterior view (P=0.1) and in anterior (22.5%) vs. posterior LV lead position (18.1%) on lateral view (P=0.5).Also we did not find any difference in complication rate among the groups. There was a moderate correlation (r =0.5) between the distance between LV and RV electrodes and two year mortality.
Conclusions: In our study we did not find any statistically significant differences in two year mortality in groups with diverse LV lead position. There was a moderate correlation between the distance between LV and RV electrodes and two year mortality in patient with CRT.

Long - Term Safety and Feasibility of ICD Programming to Reduce Shock Burden in Primary Prevention

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Aim: To evaluate whether strategically chosen detection and treatment parameters affect the incidence of device shock delivery and of among patients implanted with an ICD for primary prevention. The associations with the incidence of NSVT and various types of SVT's were evaluated as well. Background Previous studies have demonstrated that the utilization of strategic programming to reduce the burden of shock is both feasible and safe during medium-term follow up.
Methods: The study cohort comprised of 300 patients with ICD's of various manufacturers implanted between 2005-2009. The ICD's of 160 patients were programmed in a manner aimed to reduce the incidence of shocks (group 1). This strategy comprised of a VT monitoring zone for rates between 167 and 181 beats per minute, anti-tachycardia pacing for stable VT at rates between 182 and 250 beats per minute maintained for 30 beats and high energy shock delivery for rates above 250 beats per minute. SVT discrimination was enabled as well. The ICD's of the remaining 140 patients were programmed according to traditional parameters(group 2).
Results: Baseline characteristics were similar, and the average follow up was 3.5 years. Cox regression analysis showed that the occurrence of both appropriate and inappropriate shocks was significantly reduced for group 1 (3.8% Vs. 7.9%, $p=0.01$ and 1.3% Vs. 10%, $p<0.001$, respectively). The incidence of syncope was lower as well in group 1 (0.6% Vs. 5%,$p=0.001$). The incidence of NSVT was lower for group 1 patients (3.6% Vs. 15%, $p=0.004$), while no difference existed in SVT events. In accordance, a multivariate model showed that device programming conferred a 65% and 76% reduction in the incidence of appropriate and inappropriate shock deliveries, respectively.
Conclusions: Long-term follow up results of strategically chosen VT detection and therapy parameters show consistent efficacy in reducing shocks, as well excellent safety profile for a primary prevention patient population.

The Role of High Precordial Leads for the Diagnosis and Risk Stratification of Brugada Syndrome

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Introduction: Type 1 Brugada ECG is essential for the diagnosis of Brugada syndrome (BS). The objective of this study was to examine the role of high precordial leads in ECG or 12 channel holter ECG recording in the diagnosis and risk stratification of BS.
Methods: Three hundred and sixty patients (age 38± 18, 64% males) with clinical diagnosis (57%) or suspicion of BS and positive genetic analysis for SCN5A mutation were included. ECG and 12 channel holter ECG were analyzed for a type 1 pattern in either the standard or high leads (third intercostal space). The risk for severe cardiac events was assessed during the follow up.
Results: Rates of detection of BS increased from 3% to 17% (p = 0.004), and to 13% (p=0.002), when 12 channel holter and high lead ECG were added respectively to standard ECG. Addition of 12 channel lead holter with high leads increased the detection rate to 32%. During the follow up of 7.1± 3 years, 25 patients (7%) had severe events (19 cardiac arrest, 3 died and 3 had appropriate ICD discharge). Thirty cases with type 1 pattern observed only in high leads (ECG or holter), had the same clinical characteristics and the same total and severe cardiac events rate as patients diagnosed with standard leads. In Cox regression analysis type 1 Brugada pattern in standard ECG (95%CI 1-5.8, HR 2.3, p= 0.05), type 1 in high lead ECG (95%CI 1.5-23.5, HR 6, p= 0.009) and type 1 pattern in high leads ECG or holter (95%CI 1.8-42, HR 8.9, p= 0.006) were risk factors for severe cardiac events during the follow up.
Conclusion: ECG with high leads and 12 channel leads holter with standard and high leads are useful and simple tools to diagnose BS. Spontaneous type 1 pattern in standard leads as in high leads is a risk factors for severe cardiac events in BS.

Prevalence of T Wave Alternans Late After Repair of Tetralogy of Fallot

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Background: Sudden death is a dreaded late complication after surgical correction of tetralogy of fallot (TOF). Microvolt T wave alternans (mvTWA) is a non invasive method used to risk stratify patients with Left ventricular dysfunction at risk of lethal ventricular arrhythmia. Little is known about the role of mvTWA in risk stratification of patients after surgical correction of TOF.
Aims of the study: A prospective analysis To determine TWA prevalence and its association with echocardiographic and epidemiologic variables associated with sudden cardiac death.
Methods: A prospective analysis of patients after surgical correction of TOF. Assessment of TWA and associated echocardiographic and clinical parameters.
Results: 34 patients after repair of TOF were included (mean age- 43,47% men). Mean age for TOF repair was ten. 21 patients needed at least two surgeries for TOF (61%). RBBB found in 28 out of 34 patients (82%). 14 patients had positive TWA test (41%). Positive TWA test was associated with older age at TOF repair (9 years vs 4 years, p-0.008), higher LVEDD (48mm vs 42mm, p- 0.006) and higher LVESD (30mm vs 27mm,P-0.05), presence of right ventricular hypertrophy (57% vs 20%, p- 0.036) and also higher degrees of dilatation in aortic sinus level and ascending aorta (38mm vs 34mm at sinus level, 37mm vs 33mm at ascending aorta level, p-0.025, p- 0.003, respectively). There was a trend for positive TWA in patients with mild leak around VSD patch (35% vs 10%, p- 0.09). QRS width and QTC were longer in average in patients with positive TWA but it did not rich statistical significance (QRS of 160ms vs 130ms and QTc OF 440ms VS 420ms respectively).
Conclusion: Positive TWA was associated with older age at repair, left ventricular systolic and diastolic dilatation and right ventricular hypertrophy. All known as prognostic factors post TOF repair. We also found an association with Aortic regurgitation and aortic dilatation which was not described previously.