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Cost of care distribution in brady-tachy syndrome after pacemaker implantation

P. Rucinski¹, A. Kutarski², L. Wdowiak³

¹University Medical Academy of Lublin, Dept. of Cardiology, Lublin, Poland; ²Medical University of Lublin, Dept of Cardiology, Lublin, Poland; ³Medical University of Lublin, Dept of Health Care Economics, Lublin, Poland

Atrial based pacing is an accepted method of treatment in bradycardia-tachycardia syndrome (BRTS). It helps in bradycardia dependent symptoms and decreases atrial fibrillation burden as well. As atrial fibrillation (AF) present gross economic problem for health care payers.

We would like to know what the impact of AF is on cost of care in BRTS patients after pacemaker implantation. The aim of the study was to assess costs of care and distribution of their drivers in patients with BRTS and implanted pacemaker.

Methods: The study population consisted of 145 patients with BRTS, paroxysmal AF and atrial based pacing system implanted during one year in our center. The mean age was 68,5 years and 42,1% were male. Pacing systems were in 64,8% AAI. The data on utilized resources were collected retrospectively in 3 years time window (starting from the implantation) in patients who were alive at the end of study period. The costs were calculated from the public health care payer perspective.

Results: During 3 years time period 20 patients died (13,8%). Among the survivors 103 (82,4%) patients reported at least one AF episode, 19 (15,2%) had chronic AF at the end of study period, 77 (61,6%) were hospitalized due to AF or AF related conditions. The mean annual cost of AF therapy was 1923 PLN (about 500 Euro) per patient. The first cost driver was AF hospitalizations (38,3%), followed by drugs (24,4%), pacing complications costs (21,1%), consultations (6,1%), pacemaker follow-up (4,2%) and AF complications (mainly stroke) 5,9%.

Conclusion: In patients after pacemaker implantation due to brady-tachy syndrome hospitalizations due to AF or its complications represent the major cost driver.

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T-STAR interim results: therapy Advisor for optimising the pacemaker AF therapy

A. Schuchert¹, W. Brunekreeft² on behalf of T-STAR investigators

¹University Hospital Eppendorf, Hamburg, Germany; ²Vitatron Medical B.V., Arnhem, Netherlands

Introduction: modern digital pacemakers have the ability to store a large amount of clinically relevant pacemaker and patient data. Furthermore they feature a wide array of algorithms for both rate and rhythm control in Atrial Fibrillation (AF). Analysis of all AF related diagnostics and activating the best algorithms in each individual patient might be time-consuming. Therefore an expert-system, the Therapy Advisor (TA), was developed. During initial interrogation the TA automatically analyses all data, indicates which diagnostics need attention by means of Main Observations (MOs), Detailed Information Messages (DIMs). It also provides Programming Advices (PAs) to optimise pacemaker therapy. T-STAR evaluates the AF related messages of the TA. These interim results include an analysis of the messages given by a computer simulation program of the TA in 55 patients with a Selection model 9000 pacemaker. And 10 patients with the Therapy Advisor incorporated in their Vitatron T70 DR pacemaker.

Methods: prospective, multicentre, observational study. Inclusion: Class I/II pacing indication, Registry Consent. Interim analysis: follow-up of 65 patients, appropriateness and clinical relevance of TA messages. The investigators were asked to diagnose and treat patients prior to using the TA.

Results: including data of 65 patients: 60% male, age: 72.1±8.1, primary indication: SSS 63%. Average time since implant: 17.6±15.3 months; 63% of the patients had their pacemaker longer than 6 months. 6 patients were excluded due to protocol deviations.

180 messages concerning AF were generated in 32 out of 59 patients. 89.4% of all messages were considered to be appropriate to the investigators. In detail: 94.7% of MOs, 91.3% of DIMs and 82.0% of PAs.

In three cases the TA gave a programming advice the investigator had not thought of.

The investigators feedback will be used to refine future upgrades of the programmer software.

Conclusion: these results confirm the clinical relevance of the Therapy Advisor for optimising the pacemaker AF therapy.

TUESDAY, 28 JUNE 2005, 14:00-18:00

POSTER HALL

Catheter ablation and atrial fibrillation: the days and months after

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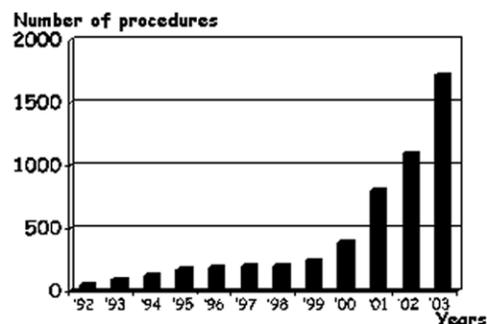
The use of trans-septal catheterization in the electrophysiology laboratory is increasing: data from the Italian survey

R. De Ponti¹, R. Cappato², A. Cumis³, P. Della Bella⁴, L. Padeletti⁵, A. Raviele⁶, J.A. Salerno-Uriarte⁷, M. Santini⁸ on behalf of the TrAns-septal Catheterization - Italian Survey (TACIS) members ¹Varese, Italy; ²S.Donato Milanese, Italy; ³Brescia, Italy; ⁴Milan, Italy; ⁵Florence, Italy; ⁶Mestre, Italy; ⁷Dept.Cardiovascular Sci, H di Circolo, University of Insubria, Varese, Italy; ⁸Rome, Italy

Purpose: to report data on trans-septal catheterization (TSP-C) performed in Italy for ablation of left sided arrhythmogenic substrate between 1992 and 2003.

Methods: data forms were sent to 34 Italian EP centers, which routinely perform TSP-C for arrhythmia ablation. For each center, the following data were requested: number of procedures per year, indications, methods, number of cases in whom the procedure was not accomplished, reasons for non accomplishment and complications. Pts with a patent foramen ovale were excluded.

Results: 30/34 centers (88%) participated and 5,269 TSP-C procedures were included in the survey. The number/year is reported in the figure; the highest increase in the number of TSP-Cs was observed in 2001 (+104%). In 16 centers, ablation of atrial fibrillation was the indication for TSP-C in ≥80% of the procedures. Overall, 5,224/5,269 procedures (99.1%) were successfully accomplished and 28 centers had a success rate ≥ 95%. Reasons for not accomplishing TSP-C were: lack of localization of the fossa ovalis (23 procedures), puncture of the right atrial free wall (12), puncture of the aortic root (5), resistant atrial septum (5). In 16 centers, complications were reported in 25 procedures accounting for 0.47%: cardiac perforation with pericardial bleeding was observed in 6, cardiac perforation with tamponade in 5, aortic root perforation in 3,



TSP-C 1992-2003

arterial embolism in 4, air embolism in 2 and other minor complications in 4; death due to cardiac perforation was reported in 1 case.

Conclusions: in Italy, the use of TSP-C performed by electrophysiologists is increasing over the last years and it is mainly related to ablation of atrial fibrillation. Despite its wide use, TSP-C is associated with high success and low complication rate.

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Heart rate variability after circumferential pulmonary veins catheter ablation in patients with paroxysmal atrial fibrillation: long-term follow-up results

K. Szydło¹, A. Wnuk-Wojnar², M. Trusz-Gluza², C. Czerwinski², I. Wozniak-Skowerska², S. Nowak², A. Hoffmann²

¹Sosnowiec, Poland; ²I Dept. of Cardiology, Silesian Medical Academy, Katowice, Poland

Background: previous studies suggested that local denervation induced by circumferential pulmonary veins (CPV) radiofrequency catheter ablation (RFCA) could be related to efficacy of the procedure. Therefore, the purpose of our study was to compare heart rate variability (HRV) values measured before and 6-9 months after CPV ablation in patients (pts) with and without of paroxysmal atrial fibrillation (PAF) recurrences.

Methods: the study population consisted of 45 highly symptomatic pts with drug refractory PAF who underwent RFCA of PVs, according to Pappone technique (31 males, age: 55±8 years) with left ventricular ejection fraction >50%. 24-hour Holter recordings were performed before (H0) and 6-9 months (median 7 months, H1) after the procedure using Reynolds Pathfinder 700 system. Time domain HRV parameters were used: SDRR and rMSSD for whole pts and frequency domain (VLF, LF, HF and LF/HF) in H1. Analysis was performed from the sinus rhythm (duration above 16 hours with morning hours preserved).

Results: 6-9 months after RFCA 17 pts had relapses of PAF (AF+) and 28 pts were free of PAF (AF-). They did not differ in age, gender, the presence of heart disease and medical treatment. Analysis of HRV parameters, as well mean and minimum HR, in whole population showed the absence of remarkable differences between H0 and H1. Notwithstanding, comparison of HRV (H0 vs. H1) obtained in AF+ and AF- pts revealed that their trends were remarkably different. SDRR increased after RFCA in AF- pts from 103±24 ms to 136±21 ms (p<0.005) while in AF+ pts it did not change (112±14 ms vs. 113±28, NS), the difference in H1 for AF- vs. AF+ with p<0.0001. rMSSD measures in H0 and H1 were similar in AF+ (25±6 ms vs. 20±5 ms, NS), but in AF- pts significantly higher values were found (21±4 ms vs 30±8 ms, p<0.05), the difference in H1 for AF- vs. AF+ with p<0.0001. Remarkable increase in frequency domain parameters measured in H1 was also observed in AF- vs. AF+ (p<0.005).

Conclusions: patients with successful clinical outcome of circumferential PV ablation are characterized by significantly higher values of HRV at 6-9 months after the procedure, opposite to those with AF recurrences. Our study confirms that this approach influences sympathovagal balance.

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TEE retrospective Doppler-echo evaluation of pulmonary vein flow and left ventricular function after circumferential RF catheter ablation of pulmonary veins due to paroxysmal atrial fibrillation

A. Drzerwiecka-Gerber¹, A.R. Rybicka Musialik², J. Krauze¹, C. Czerwinski¹, I. Wozniak-Skowerska¹, A. Hoffmann¹, S. Nowak¹, K. Wita¹, M. Trusz-Gluza¹, A.M. Wnuk-Wojnar¹

¹SPSK 7, GOK, Ist dept of Cardiology, Katowice, Poland;

²Gornoslaskie Centrum Medyczne, Klinika Kardiologii, Katowice, Poland

Aim of the study: to assess whether successful RF catheter ablation of PV influences left ventricular function and pulmonary vein flow long-term follow-up with transesophageal echocardiographic assessment.

Methods and results: thirty three pts, age 53±12,20 yrs, with refrac-

tory to antiarrhythmic drugs and highly symptomatic episodes of atrial fibrillation

(AF), underwent RF catheter ablation by circumferential pulmonary vein isolation (CPVI), according to Pappone technique. Electroanatomical CARTO system was used. Clinical assessment of arrhythmic episodes occurrence as well as transoesophageal echocardiography examination (TEE) was performed 14±4,21 months after procedure.

Following echocardiographic data were analyzed: left ventricular ejection fraction (LVEF, %), left atrium end-systolic area (LA, cm²), E/A diastolic mitral flow ratio, isovolumetric relaxation time (IVRT, ms), E wave deceleration time (DT,ms), PV ostial diameter (mm), PV Doppler flow velocities (m/s), regarding left and right superior and inferior PV (LSPV,RSPV, LIPV, RIPV).

8 pts (24%) reported symptoms of arrhythmia, AF episodes of mean duration time 37,2±28,7 hrs were noted in 7 days Holter monitoring. Mean LVEF was 63±5,7%. Results of some TEE parameters assessment are shown in table 1. Although, we found 5 pts with elevated systolic maximal Doppler velocity flow in LSPV, (≥110cm/s), one with corresponding turbulence of the flow signal (no adequate difference between systolic and diastolic flow), two of them presented clinical symptoms of mild dyspnea and hemoptysis.

EF%	IVRT ms	DT ms	E/A	LSPV (VMAX)	LSPV diameter
63±6	108±22	175±51	1,04±0,1	0,76±0,3	9,73±1,7
LIPV (V MAX)	LIPV diameter	RSPV (V MAX)	RSPV diameter	RIPV (V MAX)	RIPV diameter
0,46±0,24	6,64±3,3	0,55±0,1	8,8±2	0,52±0,2	7,4±3,1

Conclusions: preliminary results of a long-term echocardiographic follow-up of pts referred for catheter ablation of AF, show good clinical results with no evident signs of PV flow impairment.

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Mapping and ablation of recurrent arrhythmias after MAZE III surgery for lone atrial fibrillation

L.V.A. Boersma¹, E.F.D. Wever², F. Wittkamp³, N.M. Van Hemel²

¹Driebergen-Rijsenburg, Netherlands; ²St. Antonius Hospital/HLCU, Cardiology Department, Nieuwegein, Netherlands; ³UMCU/HLCU, Cardiology Department, Utrecht, Neiterlands

Purpose: maze III surgery for lone paroxysmal atrial fibrillation (PAF) shows freedom of atrial arrhythmias in over 80% of patients. The mechanisms of late recurrences of arrhythmias are unclear.

Methods: eleven of 139 pts who underwent classical MAZE III surgery were evaluated by electrophysiological study (EPS) for arrhythmia recurrences between 1999 and 2004. Multipolar catheters in both atria were used to induce and map tachycardia. Localisa or NavX mapping was used for 3-D representation of the atrial activation. RFCA was performed with a standard 4-mm RF catheter.

Results: during ECG follow-up after MAZE III surgery, continuous atrial ectopy was seen in 1 pt, atypical flutter (FL) was present in 2, PAF in 5, typical FL and PAF in 1, AVNRT in 1 and AVNRT with PAF in the remaining pt. EP evaluation of the effects of surgery showed persisting conduction from the pulmonary vein (PV) button to the remaining atrium in 4 pts. Conduction over the mitral isthmus (MI) persisted in 5 pts, and in 2 of them also over the tricuspid isthmus (TI). The surgical lines were thus found to be incomplete in at least 7 of 11 pts. In all 11 pts arrhythmias were inducible during EPS and an attempt at RFCA was made. Three pts with an incomplete PV button line had PAF, and a successful PV isolation procedure was performed by RFCA at the PV ostium. One pt with an incomplete TI line had typical FL, which was successfully treated with RFCA of the isthmus. In this pt with also PAF, a remaining left atrial focus could not be abolished. One pt with an incomplete MI line had atypical FL, but RFCA failed to close the