

Quality of Life after Radiofrequency Ablation of the Atrioventricular Node in Patients with Atrial Fibrillation of Nonvalvular Genesis: A Comparison of Pacemaker Mode Efficacy

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Summary

In recent years, evaluation of patients' quality of life has become an integral way to study the effectiveness of various medical treatments. In the present study, the quality of life of 64 patients with atrial fibrillation was analyzed. The quality of life of patients who underwent radiofrequency catheter ablation of the atrioventricular node with subsequent implantation of a permanent VVI, DDD, DDDR, or VVIR pacemaker was compared to the quality of life of patients who received only antiarrhythmic drug therapy. Our results showed that radiofrequency catheter ablation of the atrioventricular junction with implantation of a VVIR, DDD, or DDDR (but not VVI) pacemaker improves patients' quality of life when compared to the preoperative state as well as the quality of life of patients who rejected surgical intervention or who had not been presented with a surgical option despite drug resistant AF.

Key Words

Atrial fibrillation, radiofrequency catheter ablation of the atrioventricular node, pacemaker mode, quality of life

Introduction

The evaluation of various characteristics of a disease and the effect of its treatment based only on a clinical picture and objective study methods is today considered to be an incomplete process [1-3]. In this context, it is recommended that a quality of life (QoL) evaluation be used as an additional tool for effective patient management [5-7]. In medicine, QoL reflects the level of a patient's satisfaction with those aspects of life which are affected by a disease or its treatment [8]. There are three crucial medical components of QoL used in clinical studies: functionalities, patient's subjective perception of health status, and basic symptoms of the disease [9,10].

In the majority of patients, development of atrial fibrillation (AF) leads to a decrease in QoL [11]. It has been shown that the QoL of patients with AF can be improved with effective antiarrhythmic therapy [12]. On the other hand, radiofrequency catheter ablation (RFCA) of the atrioventricular (AV) node with implantation of a DDDR pacemaker for patients with paroxysmal AF, and VVIR pacing in patients with chronic

AF can improve QoL, especially for drug-resistant patients [13-19]. However, contradictory information exists about QoL dynamics in patients who received a VVI pacemaker after RFCA of the AV junction. The objective of this study was to evaluate the effect of pacing on the QoL of patients with AF after RFCA of the AV node.

Materials and Methods

The group of 40 patients with AF of nonvalvular genesis underwent RFCA of the AV node with implantation of a permanent pacemaker. Group A1 with VVI pacemakers included 32 patients (80%). Group A2 with DDD, DDDR, and VVIR pacemakers included 8 patients (20%). Group B consisted of 24 patients with antiarrhythmic drug resistant AF who had rejected surgical intervention or who had not been presented with a surgical option. The first follow-up was performed 1 day after hospitalization (before the operation). The duration of the follow-up period was 36 ± 10 months

	Group A (n = 40)	Group B (n = 24)	p-value
Age (years)	60.4 ± 8.3	58.4 ± 7.5	n.s.
Female	25 (62%)	18 (75%)	n.s.
Male	15 (38%)	6 (25%)	n.s.
Duration of AF attacks (h)	16.7 ± 4.1	12.9 ± 5.9	n.s.
Heart rate at AF (beats/min)	168 ± 34	161 ± 48	n.s.
Patients with			
Daily AF	18 (35.3%)	9 (41%)	n.s.
Weekly AF	19 (37.3%)	8 (36.3%)	n.s.
Monthly AF	14 (27.4%)	5 (22.7%)	n.s.
Chronic permanent AF	2 (5%)	2 (8%)	n.s.
Sick sinus syndrome	21 (52%)	8 (33%)	n.s.
Adams-Stokes attacks	25 (41%)	3 (12.5%)	<0.01
NYHA functional class	2.7 ± 0.6	2.5 ± 0.4	n.s.

Table 1. Clinical structure of the patients with atrial fibrillation before radiofrequency catheter ablation of the atrioventricular node and pacemaker implantation in Group A. Part of data is presented as mean ± standard deviation. n.s. = not significant.

(range 14 – 48 months). The main cause of AF in Group A was ischemic heart disease. Ischemic heart disease was the underlying disease for 25 patients (63%); eight patients (20%) had dilated cardiomyopathy, and seven patients (17.5%) had idiopathic AF. There was no discernable difference in the etiology of AF in Group B patients. The clinical composition of the patients is shown in Table 1. The only difference between the two groups was the frequency of Adams-Stokes attacks.

All patients underwent a traditional examination, as well as a 12-lead ECG, echocardiography, and Holter ECG exams. When necessary, a transesophageal or intracardiac electrophysiologic study was also carried out. Physical load tests were used to determine the exercise stress tolerance, and all patients were categorized into a NYHA functional class [20].

QoL was analyzed by the first part of the Nottingham Health Profile (NHP) questionnaire [21,22]. The questionnaire analyzes the following components (areas) of QoL: energy level, pain, emotional reaction, sleep, social isolation, and physical abilities. Each item is weighted and scores range from 0 to 100; the higher the score, the greater the health problem.

Due to the low reproducibility and validity of the NYHA class [22], the Duke Activity Status Index

(DASI) was also used for evaluation of the patients' functional states [24]. The DASI consists of 12 items with descriptions of different kinds of physical stress. Instead of defining a functional class, the DASI system evaluates the patient's functional state, which is completed by summarizing the QoL scores of individual items. The greater the value of this parameter, the higher the physical load tolerance. According to DASI, the functional state of healthy people is given as 58.2 points. The statistical analysis was performed using parametric (Student's t-test) and nonparametric (Mann-Whitney U-test, Wilcoxon rank test) methods. For results, introduced in the alternate form, the χ^2 criterion and precise Fisher test were applied. The probability value $p < 0.05$ was considered reliable.

Results

No meaningful difference was detected when studying and comparing the baseline QoL in Groups A and B using NHP and DASI. In addition, there was no difference between the preoperative status of QoL in patients who received VVI pacemakers versus those who received DDD, DDDR, or VVIR pacemakers after RFCA of the AV node. Based on NHP data, the analysis of the causes of the QoL decrease in patients with AF showed that most patients had experienced the most substantial negative effects in the categories of emotional reaction, sleep, and energy level (Figure 1). At the same time, the NHP indicated that decrease in QoL was less prominent when it came to patient functionality, i.e., pain, physical abilities, and social isolation. The DASI questionnaire also showed some decrease in the functionality of the same patients.

The analysis of QoL dynamics in Group B showed a marked decrease of QoL in the NHP areas of emotional reactions (from 48.6 ± 16.7 to 58.0 ± 14.5 points, $p < 0.05$) and sleep (from 53.3 ± 16.6 to 69.4 ± 21.5 points $p < 0.05$). Conversely, the NYHA functional class did not show any significant changes during the control period.

In Group A1, an analysis using the NHP method and DASI questionnaire did not show significant changes in QoL before and after the intervention. A decrease in NYHA class from 2.6 ± 0.5 to 2.9 ± 0.4 ($p < 0.05$) was detected at the same time.

In Group A2, a significant increase in QoL regarding the NHP areas of emotional reactions ($p < 0.05$), sleep ($p < 0.01$), physical abilities ($p < 0.05$), and pain

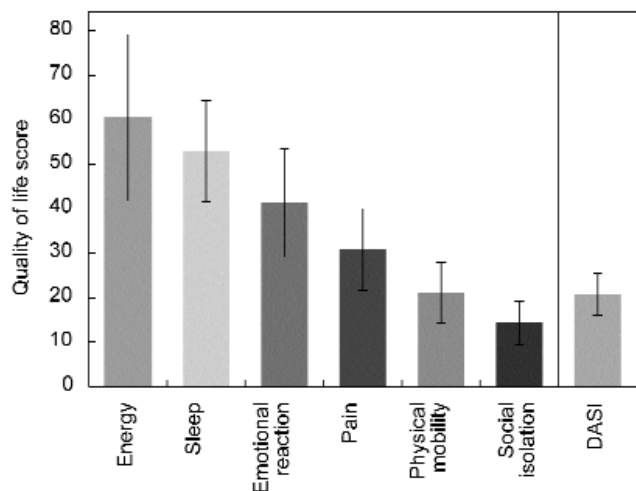


Figure 1. Quality of life according to the Nottingham Health Profile in patients with atrial fibrillation (roup B). A higher value indicates restricted quality of life: energy, sleep, emotional reactions, pain, physical mobility, and social isolation. Scores are presented as mean \pm standard deviation.

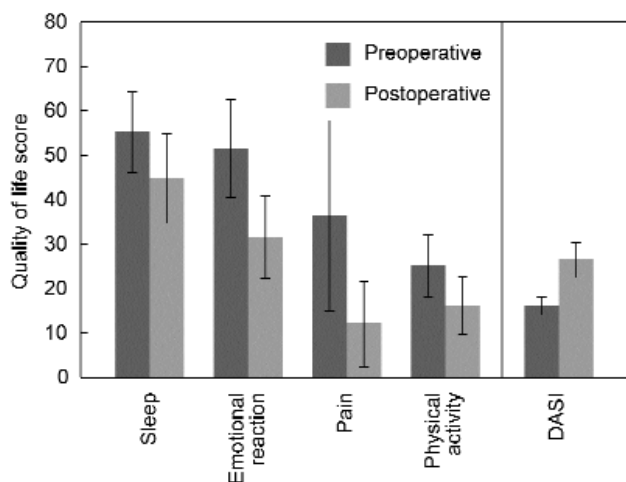


Figure 2. Quality of life according to the Nottingham Health Profile in patients after radiofrequency catheter ablation of the atrioventricular node and implantation of a VVIR, DDD, or DDDR pacemaker (Group A2). Sleep ($p < 0.01$); emotional reactions ($p < 0.05$); pain ($p < 0.05$), physical activity ($p < 0.05$); Duke Activity Status Index (DASI, $p < 0.001$). Scores are presented as mean \pm standard deviation.

($p < 0.05$) was observed (Figure 2). The DASI method noted an increase in exercise stress tolerance. In this subgroup, there were no significant changes in NYHA class. An end-of-study comparison of the QoL between Group A1 and Group B after surgery yielded the fol-

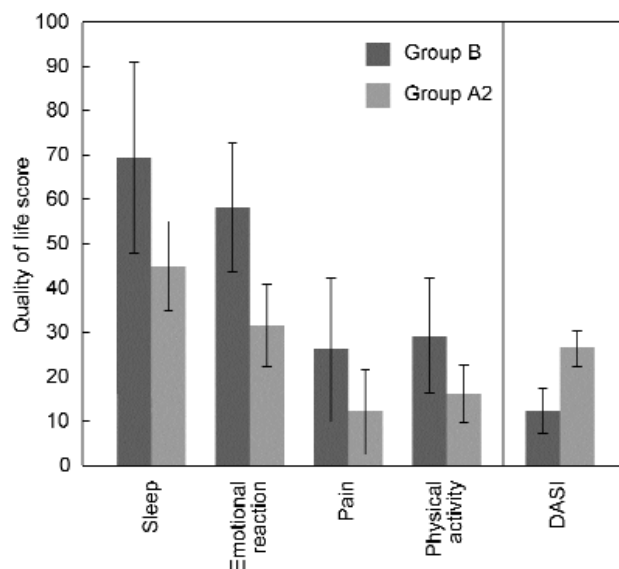


Figure 3. Quality of life according to the Nottingham Health Profile in patients after radiofrequency catheter ablation of the atrioventricular node and implantation of a VVIR, DDD, or DDDR pacemaker (Group A2) compared with Group B, the patients who did not undergo an operation: sleep ($p < 0.01$), emotional reactions ($p < 0.001$), pain ($p < 0.05$), physical activity ($p < 0.05$), Duke Activity Status Index (DASI, $p < 0.001$). Scores are presented as mean \pm standard deviation.

lowing results. There was no significant difference in QoL between patients receiving drug therapy and patients after RFCA of the AV node with implantation of VVI pacemakers. At the same time, the postoperative QoL of patients with VVIR, DDDR, or DDD pacing was significantly higher than for patients in Group B. The difference was registered in emotional reactions ($p < 0.05$), sleep ($p < 0.01$), and pain ($p < 0.05$). The improvement of the patients' QoL in Group A2 in comparison to Group B was shown using DASI as an additional method ($p < 0.05$). The NYHA class of both groups did not change.

Discussion

For the patients included in our study groups, AF mainly disturbed the patient's emotional state and his sleep; deterioration of the physical aspects of QoL were less pronounced. The low energy level scores on the NHP are probably associated with the fact that most patients (61%) were over 60 years of age (the average age was 60.4 ± 8.3 years).

In this manner, we can see a QoL decrease in patients who are resistant to antiarrhythmic AF therapy and for patients for whom constant antiarrhythmic therapy is contraindicated. This deterioration is of primary importance to the patient's emotional state and sleep quality. It is apparently caused by a gradual increase in the negative effects of AF in this group.

Thus, in patients with DDD, DDDR, or VVIR pacing, we observed positive changes in emotional status, improvement of sleep quality, and a decrease in pain intensity with accompanying increase in functionality. These positive effects can be explained by the atrioventricular synchronization and rate adaptation to physical loads brought about by pacing, which resulted in an increase in stroke volume, minute blood volume, and exercise.

Conclusion

RFCAs of the AV node with implantation of a permanent DDD, DDDR, or VVIR pacemaker in patients with drug-resistant AF results in an increase in the exercise tolerance, improvement of emotional status, normalization of sleep, and decrease in pain intensity. The postoperative QoL in those patients exceeded their preoperative QoL.

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