

Effect of Radiofrequency Catheter Ablation on Quality of Life in Patients with Wolff-Parkinson-White Syndrome

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Abstract

Wolff-Parkinson-White (WPW) syndrome is one of several disorders of the conduction system of the heart that are commonly referred to as pre-excitation syndromes. As the syndrome significantly reduces the patients' quality of life (QoL), the purpose of the current study was to compare QoL scores in patients with WPW syndrome before and after a radiofrequency catheter ablation (RFA) procedure. To assess the patients' QoL, the MOS 36-Item Short-Form Health Survey was used. Immediate and long-term outcomes of radiofrequency catheter ablation were analyzed in 60 patients diagnosed with WPW syndrome, 41(68.3%) men and 19(31.7%) women. As compared with the controls (28 apparently healthy persons), patients with WPW syndrome before RFA experienced significant reduction in both physical and mental health components. RFA was found effective in 93.3% of patients with WPW syndrome. At 3 months after RFA, patients showed significant improvement in both physical (13.5%) and mental (17.2%) health components; at 12 months, QoL parameters reached those of the controls. (**Int J Biomed. 2015;5(3):123-126.**)

Key words: *Wolff-Parkinson-White (WPW) syndrome; radiofrequency catheter ablation (RFA); quality of life; 36-Item Short-Form Health Survey.*

Introduction

Wolff-Parkinson-White (WPW) syndrome is one of several disorders of the conduction system of the heart that are commonly referred to as pre-excitation syndromes. It is characterized by paroxysmal atrioventricular re-entrant tachycardias (AVRT) with re-excitation of a region of cardiac tissue by a single impulse (re-entry) along an abnormal accessory conduction pathway between the atria and the ventricles [1]. In the general population the incidence of WPW syndrome is between 0.1% and 0.2%, which amounts to 4 cases per 100,000 of population a year. The prevalence of WPW syndrome has been estimated at 0.1 to 3.1/1000, occurring most frequently in young men; the male-to-female ratio is 3:2. As a rule, most patients (70%) have no signs of cardiovascular disorder [2,3]. In first degree relatives of patients with WPW syndrome, the frequency of this conduction disorder increases to 0.55%. The patients with the disorder in family history are at risk to have multiple accessory atrioventricular (AV) pathways [4]. Today, a study to determine a patient's QoL is regarded

as a substantial, if not the basic, method for assessment of treatment efficacy in clinical settings. The purpose of the current study was to compare QoL scores in patients with WPW syndrome before and after the RFA procedure.

Methods

For the purpose of the study, we examined 60 patients (mean age 33.3 ± 12.1 years, *Me* 32.0 years; IQR 23.8-39.0) diagnosed with WPW syndrome, 41(68.3%) men and 19(31.7%) women. Mean duration of arrhythmia in the patients' medical history was 6.57 ± 4.43 years (*Me* 6.0 years; IQR 3.9-9.0). Twenty-eight apparently healthy persons (mean age 41.8 ± 15.4 years, *Me* 43.0 years; IQR 31.5-56.5), 8(28.6%) men and 20(71.4%) women, without cardiovascular pathologies were included in the control group. Arterial hypertension and hypotension were diagnosed in 10(16.7%) and 11(18.3%) patients, respectively; 9(15.0%) patients had ischemic heart disease in their medical histories. To assess the patients' QoL, we used MOS 36-Item Short-Form Health Survey (MOS SF-36). The SF-36 is a measure of health status and is commonly used in health economics as a variable in the quality-adjusted life year calculation to determine the cost-effectiveness of a treatment. The SF-36 consists of 8 scaled scores, which are the

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weighted sums of the questions in their section. The 8 sections include physical functioning (PF), physical role functioning (or role limitations due to physical health problems (RP), bodily pain (BP), general health perceptions (GH), vitality (or energy/fatigue) (VT), social role functioning (SF), emotional role functioning (or role limitations due to emotional problems (RE) and mental health (or psychological distress and psychological well-being) (MH).

Electrophysiology testing and radiofrequency catheter ablation

All patients who gave written consent to participate in the study in compliance with the World Medical Association Declaration of Helsinki received endocardial electrophysiology (EP) testing and RFA after withdrawal of antiarrhythmics for at least 6 half-lives. The study design was approved by commission of clinical trials at the Republican Specialized Center of Cardiology, Uzbekistan Public Health Ministry. Endocardial EP testing and the RFA procedure were performed routinely in one surgical intervention by means of the Elkart II EP system (Electropulse, Tomsk, the Russian Federation). The Seldinger technique was used to puncture the right jugular vein and left femoral vein under local anesthesia (40.0 ml of 0.5% solution of Novocain) for introduction of two electrode catheters into the heart cavity by means of introducers to perform EP testing and RFA in CS and RVA positions.

A 12-lead ECG to record baseline sinus rhythm in patients with WPW syndrome was followed by EP testing to localize an accessory AV pathway. At the accessory AV pathway localized around the tricuspid valve, the right femoral vein was punctured to introduce the ablation catheter into the heart cavity and to place it close to the pathway. During RFA (electrode temperature 50-55°C, power output 25W, electrode impedance 100-110 Ohm), electrophysiological criteria for the accessory conduction pathway's absence were registered. Retrograde trans-aortal access was used to perform the RFA for the left wall accessory AV pathway. The RFA procedure was followed by control standard EP testing. No antiarrhythmic post-operation therapy was prescribed.

All data was processed by means of a STATISTICA 6 and BIostat software packet. Quantitative parameters are presented as M±SD as well as Median (*Me*) and 25th and 75th percentiles as Inter Quartile Range (IQR). Intergroup differences were considered significant at $P=0.05$.

Results

We have analyzed immediate and long-term outcomes of radiofrequency catheter ablation in 60 patients with WPW syndrome. Manifest, latent, and intermittent forms of WPW syndrome were found in 39(65.0%), 12(20.0%) and 9(15.0%) patients, respectively. Right and left accessory pathways were registered in 34(56.7%) and 26(43.3%) patients, respectively.

Other heart rhythm disorders were registered in 19(31.7%) patients with WPW syndrome: atrial fibrillation and atrial flutter were found in 14(23.3%) and 5(8.3%) patients, respectively.

At follow-up after 12 months, radiofrequency catheter ablation performed in patients with WPW syndrome was found effective in 93.3% (n=56). In 2(3.3%) patients RFA was inefficient due to deep localization of accessory conduction pathways and their proximity to the *His* bundle. In this group, due to complications RFA was inefficient in 2(3.3%) patients. In the first case, hemotamponade occurred due to perforation of the anterior wall of the right ventricle. Mobitz' type I atrioventricular block of second degree characterized by a progressive lengthening of the P-R intervals – identical to the Wenckebach phenomenon – occurred in one patient with a parahisial accessory pathway. The pericardial cavity was drained, and nonsurgical treatment was used to arrest bleeding. All patients were discharged from the Center in satisfactory condition in 3 to 4 days after RFA.

Physical Health Component

As compared with the controls, significant reduction in the physical functioning (PF) parameter (27.2%) could be seen in patients with WPW syndrome before RFA, indicating considerable restriction of the patients' physical activity. The mean physical component summary before RFA procedure was 46.6±6.09 (Table 1).

Table 1.

The SF-36 scores in patients with WPW syndrome (Physical Health)

Scales	Control	Before RFA	After RFA		
			3 months	6 months	12 months
Physical Functioning (PF)	76.0±8.8	55.3±13.4 $P_1<0.0001$	62.0±10.5 $P_1<0.0001$ $P_2=0.003$	69.3±10.4 $P_1=0.004$ $P_2<0.0001$	77.4±8.34 $P_1=0.47$ $P_2<0.0001$
Role-Physical (RP)	75.1±10.7	42.8±12.2 $P_1<0.0001$	53.3±8.65 $P_1<0.0001$ $P_2<0.0001$	63.6±10.7 $P_1<0.0001$ $P_2<0.0001$	68.4±9.83 $P_1=0.005$ $P_2<0.0001$
Bodily Pain (BP)	80.3±8.2	49.5±9.95 $P_1<0.0001$	54.6±8.74 $P_1<0.0001$ $P_2=0.003$	56.8±13.9 $P_1<0.0001$ $P_2=0.001$	71.1±9.19 $P_1<0.0001$ $P_2<0.0001$
General Health (GH)	81.1±9.4	48.4±8.86 $P_1<0.0001$	52.6±10.1 $P_1<0.0001$ $P_2=0.02$	58.3±13.2 $P_1<0.0001$ $P_2<0.0001$	72.4±8.76 $P_1<0.0001$ $P_2<0.0001$
Physical Component Summary	74.2±5.7	46.6±6.09 $P_1<0.0001$	52.9±4.05 $P_1<0.0001$ $P_2<0.0001$	58.9±5.89 $P_1<0.0001$ $P_2<0.0001$	68.7±4.13 $P_1<0.0001$ $P_2<0.0001$

P_1 – statistical significance vs control; P_2 – statistical significance vs before RFA

WPW syndrome was demonstrated to negatively affect the patients' everyday role functioning (RP), interfering with their personal and professional activity. The role functioning parameter was found to have decreased by 43% and the BP parameter by 38.4%, demonstrating a decrease in the patients' self-assessment of health (GH) by 40.3%. More than half of patients (n=35, 58.3%) pointed out that the threat of a

tachycardia episode restricted their performance of everyday routine activities, including housecleaning, unassisted shopping, stair climbing, and carrying heavy objects. At 3 months after RFA, we saw a significant increase in all parameters of QoL Physical Health Component, as compared with the pre-treatment values. Thus, PF, RP and BP parameters were found to increase by 12.1%, 24.5% and 10.3%, respectively; GH improved by 8.7%. The physical component summary was found to have increased by 13.5%. At 6 months after RFA, significant improvements could be seen in RP (48.6%), PF (24.3%), GH (20.5%) and BP (14.7%). After 12 months, a clear tendency to improvement was observed.

Mental Health Component

Analyzing mental health parameters before RFA, we could see a reduction in VT by 27.1% in patients with WPW syndrome. As compared with the controls, RE in patients with WPW syndrome was found to have decreased most of all (by 31.3%). The mental component summary was 57.6±12.1 (Table 2).

Table 2.

The SF-36 scores in patients with WPW syndrome (Mental Health)

Scales	Control	Before RFA	After RFA		
			3 months	6 months	12 months
Vitality (VT)	81.6±9.1	59.5±15.9 P ₁ <0.0001	69.3±11.9 P ₁ <0.0001 P ₂ <0.0001	81.6±15.2 P ₁ =0.99 P ₂ <0.0001	84.2±10.4 P ₁ =0.26 P ₂ <0.0001
Social Functioning (SF)	84.4±11.6	65.3±13.9 P ₁ <0.0001	73.8±12.2 P ₁ <0.0001 P ₂ <0.0001	76.7±12.7 P ₁ =0.008 P ₂ <0.0001	78.1±13.2 P ₁ =0.03 P ₂ <0.0001
Role-Emotional (RE)	82.0±10.3	56.3±15.3 P ₁ <0.0001	71.7±11.6 P ₁ <0.0001 P ₂ <0.0001	74.7±12.8 P ₁ =0.01 P ₂ <0.0001	77.6±13.8 P ₁ =0.14 P ₂ <0.0001
Mental Health (MH)	80.1±9.7	61.5±17.5 P ₁ <0.0001	69.4±11.1 P ₁ <0.0001 P ₂ =0.004	74.7±12.1 P ₁ =0.04 P ₂ <0.0001	76.9±14.2 P ₁ =0.28 P ₂ <0.0001
Mental Component Summary	77.9±5.3	57.6±12.1 P ₁ <0.0001	67.5±5.58 P ₁ <0.0001 P ₂ <0.0001	72.1±6.24 P ₁ <0.0001 P ₂ <0.0001	75.2±7.52 P ₁ =0.09 P ₂ <0.0001

P₁ – statistical significance vs control; P₂ – statistical significance vs before RFA

Before RFA, the MH and SF scores were found significantly lower in the patients than in the controls (by 23.2% and 22.6%, respectively). In our patients, 3 months after the RFA procedure all parameters of the mental health component were significantly increased as compared with those before treatment. As compared with the scores before RFA, VT and SF parameters increased by 16.5% and 13.0%, respectively. Improvement in RE and MH scores versus pre-RFA ones could be seen as well (by 27.4% and 12.8%, respectively). The mental component summary was found to

have increased by 17.2%. At 12 months after RFA, our patients with WPW syndrome demonstrated significant improvement in their QoL; values of all mental health component parameters reached those among the controls.

Discussion

In patients with WPW syndrome, the physical component rather than the mental one seems to be responsible for the decrease in quality of life. We believe that low QoL scores in the patients with WPW syndrome before RFA procedure are associated with anxiety about their physical and emotional conditions caused by episodes of tachycardia. The patients perceived palpitations and heart flutter as well as arrhythmia attacks, which start and finish abruptly as barriers to a meaningful productive life. Almost half of the patients (n=29/48.3%) evaluated their own performance as inferior and less careful, and they thought that the volume and quality of their work decreased. The majority of patients with WPW syndrome have neither congenital nor acquired heart diseases. The physical and emotional conditions of patients with WPW syndrome, coupled with atrial fibrillation or atrial flutter, significantly affect their social activity and everyday role functioning. Revishvili et al. [5] reported that physical and mental health parameters in patients with atrial fibrillation decreased twofold as compared with those in healthy subjects. In our study, QoL physical and mental parameters were significantly lower in patients with atrial fibrillation.

Patients with WPW syndrome exhibit a wide spectrum of arrhythmias, including both ventricular and supraventricular ones, differently affecting hemodynamics. Re-entrant arrhythmias (orthodromic and antidromic tachycardias) occur in more than 70% of cases, negatively affecting patients' quality of life [6]. Some authors believe that changes in QoL parameters in patients with cardiovascular disorders are primarily governed by physical working capacity; reduction in the parameter can impede a patient's needs being met [7-9].

Conclusion

Radiofrequency catheter ablation was found effective in 93.3% of patients with WPW syndrome. At 3 months after RFA, patients showed significant improvement in both physical (13.5%) and mental (17.2%) health components; at 12 months, QoL parameters reached those of the controls.

Competing interests

The authors declare that they have no competing interests.

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