

Prophylactic accessory-pathway ablation in asymptomatic patients with a Wolff-Parkinson-White electrocardiographic pattern

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Abstract. – OBJECTIVES: The optimal approach is controversial in asymptomatic patients who are coincidentally found to have evidence of an accessory pathway (AP) on an ECG. The risk of sudden cardiac death (SCD) is low, and the risk of developing symptoms also appears to be low, although a wide range of incidences have been reported.

In our trial, we tested the hypothesis that if prophylactic accessory-pathway ablation performed at the time of the initial electrophysiological testing would improve the long-term outcome in asymptomatic patients with a Wolff-Parkinson-White electrocardiographic pattern.

PATIENTS AND METHODS: Recruitment of patients began on February 1, 2004, and ended on February 5, 2009. All 110 asymptomatic patients were hospitalized and underwent electrophysiological testing the same day to assess the inducibility of atrioventricular reciprocating tachycardia. The anterograde effective refractory period of the accessory pathway was defined as the longest coupling interval at which anterograde block in the bypass tract was observed. For the statistical analysis, the statistical software SPSS version 15.0 for Windows (SPSS Inc., Chicago, IL, USA).

RESULTS: Of 110 asymptomatic patients with a Wolff-Parkinson-White electrocardiographic pattern, 80 patients were ablated. Ablation group consisted of these patients. Control group consisted of remaining 30 and were divided into two groups according to the anterograde effective refractory period of the accessory pathway. There was no significant difference between three groups in terms of arrhythmic events ($p: 0.58$).

CONCLUSIONS: Asymptomatic patients with the Wolff-Parkinson-White syndrome do not require prophylactic ablation, since they remain asymptomatic for many years.

Key Words:

Wolff-Parkinson-White (WPW), Prophylactic accessory-pathway ablation.

Introduction

The optimal approach is controversial in asymptomatic patients who are coincidentally found to have evidence of an accessory pathway (AP) on an ECG¹⁻³. The risk of sudden cardiac death (SCD) is low³, and the risk of developing symptoms also appears to be low, although a wide range of occurrences have been reported. Among those with a Wolff-Parkinson-White (WPW) ECG pattern, the likelihood of developing symptoms varies with age: children are at the highest risk, while those who remain asymptomatic over age 35 are unlikely to develop symptoms². In our trial, we tested the hypothesis that if prophylactic accessory-pathway ablation performed at the time of the initial electrophysiological testing would improve the long-term outcome in asymptomatic patients with a Wolff-Parkinson-White electrocardiographic pattern.

Patients and Methods

Study Population

Recruitment of patients began on February 1, 2004, and ended on February 5, 2009. The inclusion criteria were ventricular preexcitation documented by 12-lead electrocardiography and the absence of arrhythmia related symptoms. The exclusion criteria were participation in other investigational protocols, an age of less than 18 years, pregnancy, multiple accessory pathways (previously studies have included this variable⁴⁻⁷), and concomitant medical conditions. The patients of control group were divided into two groups according to the anterograde effective refractory period of the accessory pathway. The study de-

sign was approved by the GATA Ethic Committee, and written informed consent was obtained from all patients.

Electrophysiological Testing

All patients were hospitalized and underwent electrophysiological testing the same day to assess the inducibility of atrioventricular reciprocating tachycardia. The stimulation protocol consisted of atrial and ventricular incremental pacing and extrastimulation to assess inducibility. Atrial and ventricular extrastimulation with progressively shorter coupling intervals was performed at drive-cycle lengths of 400 and 350 msec to induce atrioventricular reciprocating tachycardia until the effective refractory periods of the atrium and ventricle were achieved.

An episode of atrioventricular reciprocating tachycardia was terminated by rapid pacing three minutes after its onset. The anterograde effective refractory period of the accessory pathway was defined as the longest coupling interval at which anterograde block in the bypass tract was observed.

Ablation Therapy

After electrophysiological evaluation had been performed, a 7-French, large-tipped, deflectable electrode catheter was introduced through the femoral artery for ablation of a left-sided accessory pathway or by the femoral vein for ablation of a rightsided pathway. Radio-frequency energy was delivered at a power of 30 to 50 W, and if conduction over the accessory pathway disappeared within 10 seconds the energy was maintained for 60 to 180 seconds with a maximal temperature of 65°C. If conduction persisted during the 10 seconds, the energy was not maintained. A 30-minute waiting period, and the study was concluded if conduction in the accessory pathways was eliminated.

Follow-up Evaluation

For all 110 study patients, the intensity of follow up was prespecified and included complete clinical examination with serial electrocardiography and 24-hour Holter monitoring that were uniformly scheduled and performed at one, and twelve months. No antiarrhythmic drug was given. The patients were asked to report any palpitations, asthenia, dyspnea (at rest, during effort, or both), dizziness, chest pain, blurred vision, or syncope. The main prespecified end point was the occurrence of symptomatic arrhythmic

events, including supraventricular tachycardia, atrial fibrillation, and ventricular fibrillation. Patients who underwent ablation were prescribed 100 mg of aspirin per day for four weeks after the procedure.

Statistical Analysis

For the statistical analysis, the statistical software SPSS version 15.0 for Windows (SPSS Inc., Chicago, IL, USA). Values are expressed as the mean + SD. Continuous variables were compared with use of the Mann-Whitney U test. For categorical variables, the chi-square test and the exact method were used. A two-sided *p* value of less than 0.05 was considered to indicate statistical significance.

Results

Patients

Of 110 asymptomatic patients with a Wolff-Parkinson-White electrocardiographic pattern, 80 patients were ablated. Ablation group consisted of these patients. Control group consisted of remaining 30 and were divided into two groups according to the anterograde effective refractory period of the accessory pathway (10 patients were the high-risk (AERP < 250 ms), 20 patients were the low-risk (atrial effective refractory period: AERP > 250 ms) (Table I).

Arrhythmic Events

Ablation Group

The 80 patients who underwent ablation were followed for a median of 54 months (range, 48 to 60). 8 (10%) patients had an arrhythmic event.

High Risk Control Group

The 10 high risk controls were followed for a median of 54 months (range, 48 to 60). All patients continued to exhibit ventricular preexcitation during follow-up. After a median follow-up of 54 months (range, 48 to 60), 2 patients (20%) had had arrhythmic events. The arrhythmic event was supraventricular tachycardia in 2 patients (leading to severe presyncope in 1 patient).

Low Risk Control Group

The characteristics of the 20 patients at low risk are shown in Table I. Symptoms of supraventricular tachycardia developed in two patients (15%).

Table 1. Characteristics of the 110 asymptomatic patients with the Wolff-Parkinson-White syndrome.

Variable	Ablation group	High risk control group	Low risk control group
N=	80	10	20
Age (yr)	22+2	21+3	22+2
Male sex (%)	100	100	100
Structural heart disease (%)	0	0	0
AERP (msec)	–	225 (220-250)	260 (250-270)
Multiple accessory path (%)	0	0	0
Location of single accessory pathways (Figure 1)			
Left free wall	48	6	11
Right free wall	22	2	4
Posteroseptal	8	1	3
Anteroseptal	2	1	2
Hospital stay (days)	2 (2-5)	1	1
EPS (electrophysiological study)			
AVRT induction	42 (52%)	6 (60%)	10 (50%)
Arrhythmic events at five years			
Nonsustained AF	6	–	–
AVRT	2	2	3

AVRT: Atrioventricular reciprocating tachycardia; AF: atrial fibrillation.

Among the high-risk controls, the five-year rate of arrhythmic events was 20 percent, and among the low-risk controls, the five-year rate of arrhythmic events was 15 percent. The corresponding rate for the patients assigned to ablation was 10 percent. There was no significant difference between three groups in terms of arrhythmic events (p : 0.58).

Discussion

Prophylactic radio-frequency catheter ablation of accessory pathways in asymptomatic patients with a Wolff–Parkinson–White pattern at high risk or low risk for arrhythmias resulted in a non-significant risk reduction in the over a five-year

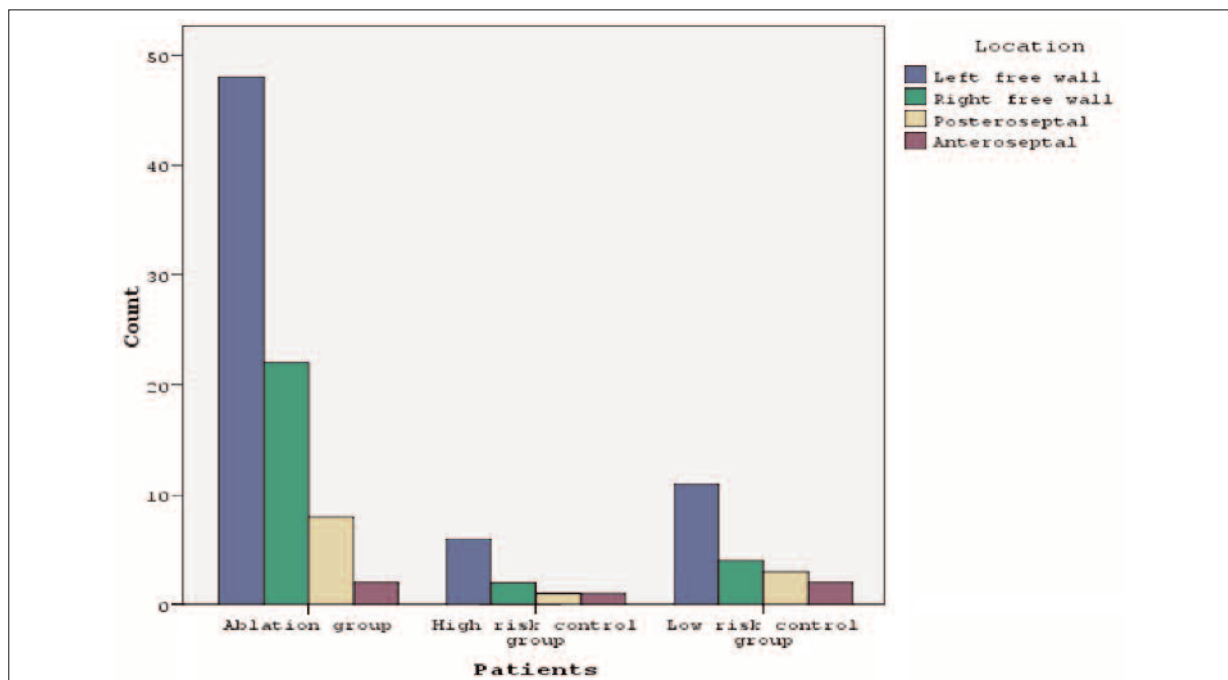


Figure 1. Comparison of location of single accessory pathways in study groups.

follow-up period (p : 0.58). At the end of the study, there were non-significant differences between the three groups.

Although the exact occurrence of CSD among asymptomatic patients with the Wolff-Parkinson-White syndrome is unknown, both electrophysiological and population-based studies suggest that it is low^{4,7}. In the present study, no patient had a potentially fatal ventricular fibrillation. The rate of spontaneous arrhythmia that we found (15-20 percent) is similar to those reported by others in patients with asymptomatic ventricular preexcitation, which range from 8 to 21 percent^{4,7}.

In addition to previous studies, we have found the Wolff-Parkinson-White electrocardiographic pattern in asymptomatic patients is associated with a good prognosis^{4,12}. Our results, thus, emphasize the importance of readdressing the issue of non-ablation follow up in this setting^{4,12}. Since catheter ablation is invasive treatment method. The risk of fatal complications has been reported to be as high as 0.3 percent¹³ and we suggest asymptomatic patients with the Wolff-Parkinson-White syndrome do not require prophylactic ablation, since they remain asymptomatic for many years.

Conclusions

We concluded that asymptomatic patients with the Wolff-Parkinson-White syndrome do not require prophylactic ablation, since they remain asymptomatic for many years.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

References

- 1) WELLENS HJ. Should catheter ablation be performed in asymptomatic patients with Wolff-Parkinson-White syndrome? When to perform catheter ablation in asymptomatic patients with a Wolff-Parkinson-White electrocardiogram. *Circulation* 2005; 112: 2201-2207.
- 2) PAPPONE C, SANTINELLI V. Should catheter ablation be performed in asymptomatic patients with Wolff-Parkinson-White syndrome? Catheter ablation should be performed in asymptomatic patients with Wolff-Parkinson-White syndrome. *Circulation* 2005; 112: 2207-2215.
- 3) TODD DM, KLEIN GJ, KRAHN AD, SKANES AC, YEE R. Asymptomatic Wolff-Parkinson-White syndrome: is it time to revisit guidelines? *J Am Coll Cardiol* 2003; 41: 245-248.
- 4) LEITCH JW, KLEIN GJ, YEE R, MURDOCK C. Prognostic value of electrophysiology testing in asymptomatic patients with Wolff-Parkinson-White pattern. *Circulation* 1990; 82: 1718-1723.
- 5) BERKMAN NL, LAMB LE. The Wolff-Parkinson-White electrocardiogram: a follow up study of five to twenty-eight years. *N Engl J Med* 1968; 278: 492-494.
- 6) MUNGER TM, PACKER DL, HAMMILL SC, FELDMAN BJ, BAILEY KR, BALLARD DJ, HOLMES DR, JR, GERSH BJ. A population study of the natural history of Wolff-Parkinson-White syndrome in Olmsted County, Minnesota, 1953 to 1989. *Circulation* 1993; 87: 866-873.
- 7) FITZSIMMONS PJ, McWHIRTER PD, PETERSON DW, KRUYER WB. The natural history of Wolff-Parkinson-White syndrome in 228 military aviators: a long-term follow-up of 22 years. *Am Heart J* 2001; 142: 530-536.
- 8) KLEIN GJ, YEE R, SHARMA AD. Longitudinal electrophysiologic assessment of asymptomatic patients with the Wolff-Parkinson-White electrocardiographic pattern. *N Engl J Med* 1989; 320: 1229-1233.
- 9) SATOH M, AIZAWA Y, FUNAZAKI T, NIWANO S, EBE K, MIYAJIMA S, SUZUKI K, AIZAWA M, CHIBATA A. Electrophysiologic evaluation of asymptomatic patients with the Wolff-Parkinson-White pattern. *Pacing Clin Electrophysiol* 1989; 12: 413-420.
- 10) BECKMAN KJ, GALLASTEGUI JL, BAUMAN JL, HARIMAN RJ. The predictive value of electrophysiologic studies in untreated patients with the Wolff-Parkinson-White syndrome. *J Am Coll Cardiol* 1990; 15: 640-647.
- 11) BREMBILLA-PERROT B, GHAWI R. Electrophysiological characteristics of asymptomatic Wolff-Parkinson-White syndrome. *Eur Heart J* 1993; 14: 511-515.
- 12) GOUDEVENOS JA, KATSOURAS CS, GRAEKAS G, ARGIRI O, GIOGIAKAS V, SIDERIS DA. Ventricular pre-excitation in the general population: a study on the mode of presentation and clinical course. *Heart* 2000; 83: 29-34.
- 13) TODD DM, KLEIN GJ, KRAHN AD, SKANES AC, YEE R. Asymptomatic Wolff-Parkinson-White syndrome: is it time to revisit guidelines? *J Am Coll Cardiol* 2003; 41: 245-248.