

Atrioventricular Reentrant Tachycardia Through Slowly Conducting left Accessory Pathway

DIMITRIOS MANOLATOS, MICHAEL EFREMIDIS, ANTONIOS SIDERIS, DIMITRIOS EVANGELOU, DIMITRA KARDARA, ILIAS SIORAS, DIMITRIOS ECONOMOU, PHOTIOS KARDARAS

B' Cardiological Clinic, "EVANGELISMOS" Hospital

Key words: Long RP tachycardia, left lateral accessory pathway.

We report on a patient with long RP tachycardia in whom there was a repetitive transition from sinus rhythm to junctional reciprocating tachycardia in terms of timing of the P wave, but not in terms of morphology. Although this accessory pathway has been classically located in the posteroseptal zone, in this case the accessory pathway was located in the left lateral wall.

Permanent junctional reciprocating tachycardia (PJRT) was initially considered to represent a tachycardia that originates from the posteroseptal zone^{1,2} only. However, recent studies³ report that a high percentage of patients with similar tachycardia characteristics have accessory pathways located in other zones.

Case description

A 48-year-old patient was admitted to the B' Cardiological Clinic of the "EVANGELISMOS" Hospital for electrophysiological investigation of repetitive episodes of palpitations, despite propafenone administration. The 12-lead ECG showed QRS tachycardia with long RP interval (RP > PR), a negative P-wave in lead I and a positive P-wave in lead V₁ (Figure 1). The arrhythmia was well tolerated and the patient was only aware of a rapid heartbeat.

The echocardiogram revealed a mild decrease of the left ventricular systolic function (Ejection Fraction = 50%) and normal atrial dimensions.

Two quadripolar 6F electrodes were percutaneously inserted in the femoral veins and were placed, under fluoroscopy, in the right ventricular apex and along

the tricuspid valve for the recording of the HIS electrogram. A third guided quadripolar catheter was placed in the coronary sinus (Figure 2). A multi-channel recorder was used to display ECG surface recordings and endocardiac electrograms simultaneously.

During sinus rhythm, the A-H (96 ms) and H-V (40 ms) intervals were within normal limits. During ventricular pacing (train frequency 600 ms) and prior to the introduction of extrasystoles, the tachycardia was induced without AH interval prolongation while no preexcitation was recorded. Right ventricular pacing with extrasystolic stimuli easily induced a narrow QRS tachycardia with 462 ms cycle length and the earlier reciprocal atrial excitation was recorded via the distal pair of coronary sinus electrodes (Figure 3). The V-A interval was 319 ms, the A-H interval was 98 ms, and the H-V interval was 45 ms.

Discussion

The patient's ECG showed a tachycardia with narrow QRS and RP interval longer than the PR interval, which is typical for permanent junctional reciprocating tachycardia when P-wave time correlation and not morphology is used as a diagnostic criterion. The first dif-

Manuscript received:
May 22, 2001;
Accepted:
November 11, 2001

Correspondence:
Dimitrios Manolatos

34, G. Karaiskaki St.
Nea Chalkidona
Athens
Tel.: (+3010) 8310238

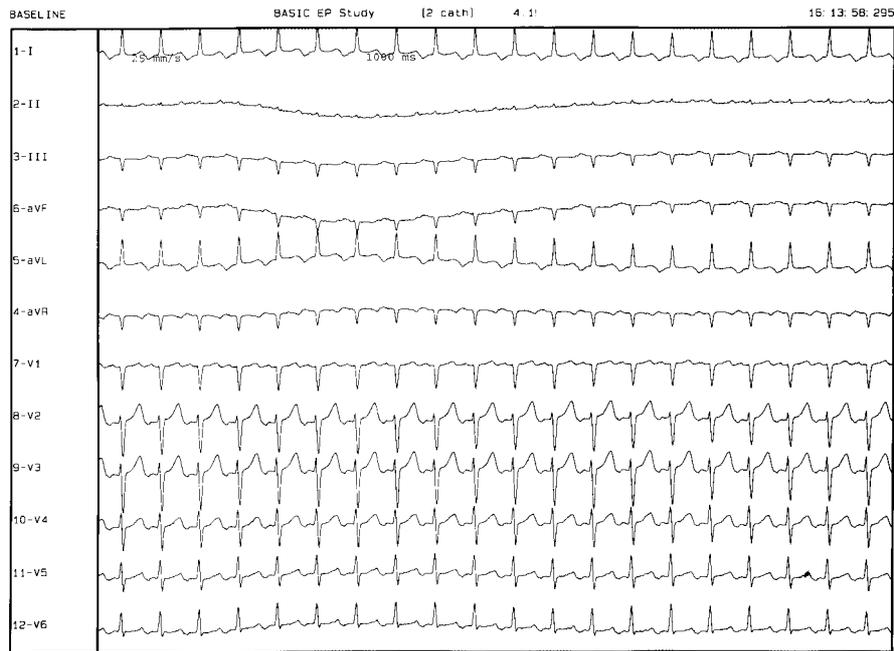


Figure 1. The ECG shows the morphology of the persistent AV reentrant tachycardia, narrow QRS, RP>PR, negative P-waves through lead I, and positive P-waves through leads V1, II, III, aVF.

ference of this tachycardia compared to the standard PJRT was the P-wave configuration, that showed that the accessory pathway is located in the left free wall. More specifically, P-wave polarity was negative in lead I, while in leads II, III, aVF and V₁ P-waves are positive. The fact that the earlier retrograde atrial excitation was recorded in the

distal coronary sinus electrode, confirms the ECG findings (Figure 3). Another difference between the described tachycardia and the standard PJRT was the fact that the patient's tachycardia was neither permanent nor incessant. In the described case, tachycardia was frequent (2-3 attacks per week, each lasting 30-60 minutes). The multiple tachy-

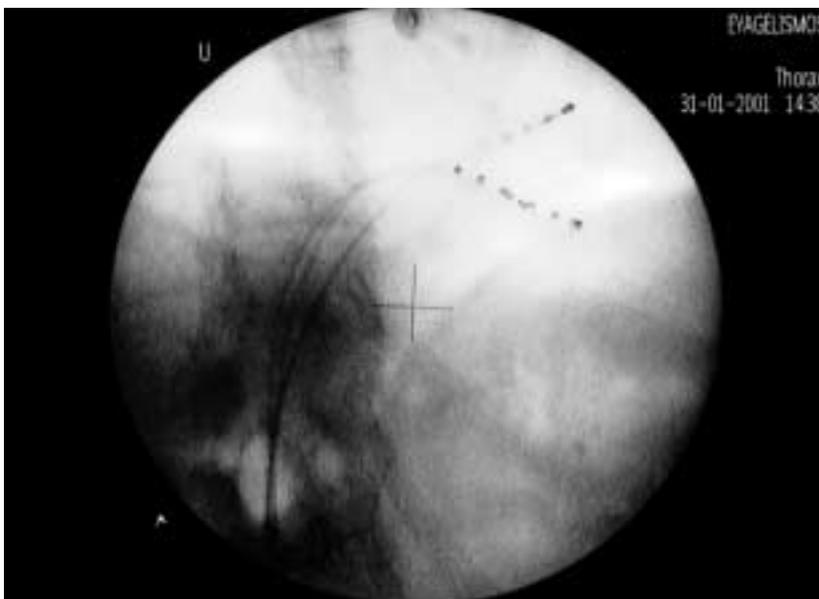


Figure 2. Left (45°) anterior oblique projection: Two quadripolar electrodes placed at the right ventricular apex and along the tricuspid valve for the recording of the HIS electrogram. A third quadripolar catheter was introduced in the coronary sinus.

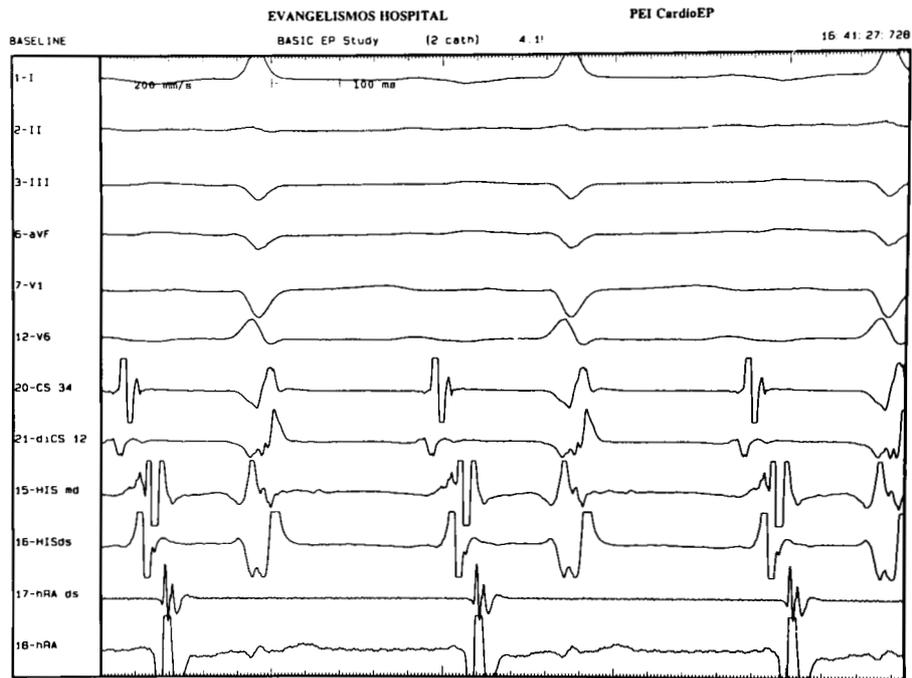


Figure 3. Endocardiac electrograms and surface ECG during tachycardia. The earlier reciprocating sinus stimulation during tachycardia was recorded through the distal pair of coronary sinus electrodes. HRA: high right atrium location; CS: coronary sinus; HIS: catheter recording the HIS pathway electrogram.

cardia episodes resulted in a mild decrease of the left ventricular systolic function⁴, despite the fact that tachycardia was not incessant.

The differential diagnosis of PJRT includes atrial tachycardia and atypical AV nodal reentrant tachycardia (fast – slow). The differential diagnosis of PJRT from the atypical AV nodal reentrant tachycardia was established by introducing relatively delayed ventricular extra stimuli during the tachycardia when the HIS bundle was in a refractory phase. The presence of atrial preexcitation, while keeping the atrial stimulation sequence unchanged, proves the presence of an accessory pathway. Furthermore, atrial tachycardia was excluded due to the fact that the introduction of a single extrasystolic ventricular stimulus during the tachycardia and just when the His bundle was in a refractory status, resulted in tachycardia termination, without atrial excitation. The administration of adenosine terminated the tachycardia by interrupting the retrograde conduction in the accessory pathway.

Gaita⁵ et al studied the detection of accessory pathways in a large number of patients with persistent AV reentrant tachycardia. Some 33 accessory pathways were studied. The earlier reciprocating atrial excitation during tachycardia appeared in the posteroseptal zone in 25 patients (76%), in the midseptal zone in 4 patients (12%), in the posterior site of the right ventricle in 1 patient (3%), in the posterior site of the left ventricle in 1 patient (3%) and in the lateral wall of the left ventricle in 1 patient (3%).

Conclusively, even though such pathways are typically posteroseptal, in certain cases they are located in the free wall of the left ventricle. Pathway detection requires a thorough and careful electrophysiological study.

References

1. Critelli G, Gallagher JJ, Monda V, et al: Anatomic and electrophysiologic substrate of the permanent form of

- junctional reciprocating tachycardia. *J Am Coll Cardiol* 1984; 4: 601-610.
2. Gallagher JJ, Sealy WC: The permanent form of junctional reciprocating tachycardia: Further elucidation of the underlying mechanism. *Eur J Cardiol* 1978; 8: 413-430.
 3. Ticho BS, Saul JP, Hulse JE, et al: Variable location of accessory pathway associated with the permanent form of junctional reciprocating tachycardia and confirmation with radiofrequency ablation. *Am J Cardiol* 1992; 70: 1559-1564.
 4. Cruz FE, Cheriez EC, Smeets JL, Atie J, Peres AK, Penn OC, et al: Reversibility of tachycardia-induced cardiomyopathy after cure of incessant supraventricular tachycardia. *J Am Coll Cardiol* 1990; 16: 739-744.
 5. Gaita F, Haissaguerre M, Giusetto C, et al: Catheter ablation of Permanent Junctional Reciprocating Tachycardia with radiofrequency current. *Jacc* 1995; 25: 648-654.