CASE REPORT

Is This Atrial Fibrillation?

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A 19-year-old girl was referred to our cardiology department for catheter ablation (isolation of the pulmonary veins) of paroxysmal atrial fibrillation (AF). The diagnosis was made upon a 12-lead ECG of the arrhythmia documented in the emergency room. The ECG showed an irregular tachycardia without wide QRS complexes. Careful assessment revealed the irregularity of the rhythm was a sweep artifact due to a mechanic failure of the ECG-machine to advance the article smoothly. During EP study a concealed antero-septal accessory pathway causing an orthodromic AV reentrant tachycardia was eliminated by radio-frequency ablation. This example emphasizes the need for careful assessment of an ECG tracing, including printed legends and technical data.

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ECG artifacts; atrial fibrillation, AVRT, printer distortion

CASE

A 19-year-old girl was referred to our cardiology department for catheter ablation (electrical isolation of the pulmonary veins) of paroxysmal atrial fibrillation (AF).

The patient complained of palpitations occurring three to five times a week, accompanied by dyspnea and thoracic oppression, limiting her physical activity, which persisted for hours with spontaneous abrupt cessation. The palpitations occurred mainly during professional dance sessions and other important physical activities.

One such episode was documented in the emergency room of another hospital. The ECG (Figs. 1 and 2) showed an irregular tachycardia with a narrow QRS-complex and a cardiac frequency about 190 bpm. Treatment with betablockers (metoprolol 12.5 mg per day) was not tolerated, because of vertigo, dizziness, and general fatigue and she was referred to our center for pulmonary vein isolation with the diagnosis of paroxysmal AF.

On admission, the patient had regular sinus rhythm without any sign of preexcitation and normal physical examination. A transthoracic echocardiography (TTE) showed normal sized cardiac chambers and normal valve and ventricular function. The diagnosis of paroxysmal atrial fibrillation in a 19-year-old without evident structural heart disease appeared unlikely and the ECGs showing the presumed diagnosis were carefully scrutinized.

The ECG showed an irregularly irregular tachycardia without wide QRS complexes. On careful examination, we realised that the irregularity of the rhythm was an artefact due to a mechanic failure of the ECG-machine to advance the paper smoothly: paper-transport being transiently stopped for a few milliseconds, producing the apparent irregularity of the cardiac rhythm mimicking atrial fibrillation.

A variable *reduction* in QRS-complex duration was observed, notably extremely narrow QRS complexes. The printed legends on the bottom and top

Figure 1. ECG documentation of the tachycardia in the emergency room, showing an irregular narrow QRS tachycardia (initially misinterpreted as atrial fibrillation). ECG documentation (extremity leads) of the tachycardia in the emergency room with a variable reduction in QRS-complex duration, notably extremely narrow QRS complexes (arrows). The printed legends on the bottom and top (including hospital name “Hôpital... Policlinique” and technical ECG data “10 mm/mV”) were also distorted with several letters missing coinciding with a narrow QRS (see arrows).

(including hospital name “Hôpital... Policlinique” and technical ECG data) were also distorted with several letters missing coinciding with a narrow QRS (Figs. 1 and 2 arrows). All ECGs documented that day in the emergency room were found to show the same artefact in occasional complexes being extremely narrow (Figs. 1 and 2 and other ECGs not shown). An abrupt shortening of QT interval with deformation of T wave (Fig. 2, asterisk) was noted. There was no variation in the width of the background grid, because preprinted paper was used.

An EP study was performed and a regular sustained narrow complex tachycardia with a frequency of 190 bpm was initiated. A diagnosis of an orthodromic AV reentrant tachycardia was made based on conventional criteria and a concealed anterosseptal accessory pathway was successfully eliminated by radio-frequency ablation. No other arrhythmias could be initiated.

This example emphasizes the need for careful assessment of all aspects of an ECG tracing, including printed legends.

Figure 2. ECG documentation (precordial leads) of the tachycardia in the emergency room with extremely narrow QRS complexes (arrows) coinciding with distortion of several letters in printed legends. Note also abrupt shortening of QT interval with deformation of T wave in the figure (asterisk).