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CASE STUDY



# Prolonged sinus pauses after the paroxysms of atrial tachycardia in children, to pace or to ablate? Case report

Irina Boiciuc<sup>1\*</sup>, Radu Darciuc<sup>1</sup>, Basri Amasyalı<sup>1,2</sup>, Erdem Diker<sup>1,3</sup>

<sup>1</sup>Cardiology Department, Medpark International Hospital, Chisinau, Republic of Moldova

<sup>2</sup>Cardiology Department, Union of Chambers and Commodity Exchanges of Turkey, University of Economics and Technology Hospital, Ankara, Turkey

<sup>3</sup>Cardiology Department, Bayındır Sogutozu Hospital, Ankara, Turkey

## ABSTRACT

**Background.** The presence of prolonged sinus pauses is quite rare in children and adolescents with structural normal heart. The decision of the optimal therapeutic tactics is always challenging.

**Case report.** The 16-years-old girl addressed with complains of palpitations and dizziness after the palpitations end. A Holter ECG monitoring was performed with the detection of prolonged sinus pauses after the paroxysm of atrial tachycardia. We decided to perform an electrophysiological study to diagnose the tachycardia type. The presence of atrial tachycardia originating from the ostium of the coronary sinus was demonstrated. We decided to manage the tachyarrhythmia with catheter ablation. During the application of the radiofrequency currents, the tachycardia stopped, and the sinus rhythm was restored. The ablation was preferred over medication taking into consideration the potential risk of worsening of the bradycardia by antiarrhythmic therapy.

**Conclusions.** The optimal therapeutic solution in similar pediatric cases should be directed towards the supraventricular tachycardia treatment and not to the bradyarrhythmia. The majority of supraventricular tachycardias could be cured by catheter ablation.

**Keywords:** catheter ablation, children, pacemaker, sinus pause, supraventricular tachycardia.

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**\*Corresponding author:** Irina Boiciuc,

MD, Cardiology Department  
Medpark International Hospital  
24 Andrei Doga street, MD-2024,  
Chisinau, Republic of Moldova  
e-mail: ira.boiciuc@gmail.com

**Author's ORCID IDs**

Irina Boiciuc – <https://orcid.org/0009-0007-5891-0030>

Radu Darciuc – <https://orcid.org/0000-0003-2088-9129>

Basri Amasyalı – <https://orcid.org/0000-0002-0009-7135>

Erdem Diker – <https://orcid.org/0000-0003-4249-948X>

## Key messages

### What is not yet known on the issue addressed in the submitted manuscript

Supraventricular tachycardia is frequently diagnosed in children. However, prolonged pauses after the tachycardia ends are still challenging for clinicians. There are insufficient data describing the management of the prolonged sinus pauses in children, including the pauses after supraventricular tachyarrhythmia.

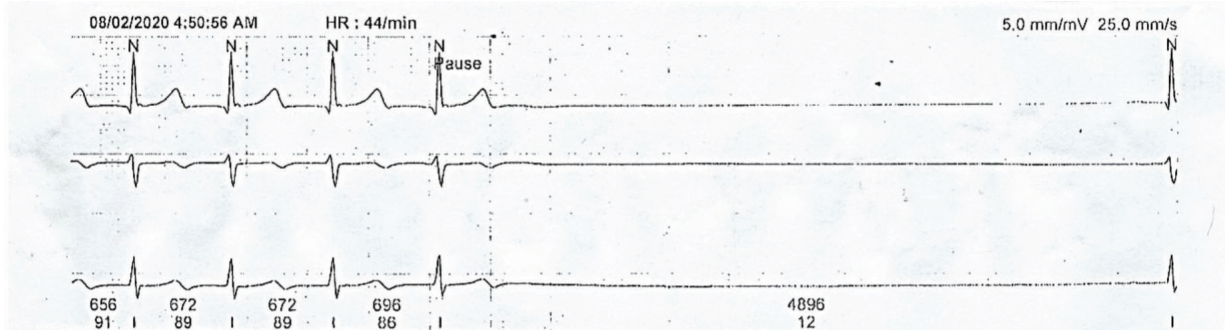
### The novelty added by manuscript to the already published scientific literature

We confirmed the relationship between sinus pauses and atrial tachycardia, and the possibility their definitive treatment by catheter ablation.

## Introduction

According to the medical literature, the presence of prolonged sinus pauses is quite rare in children and adolescents with structural normal heart. It has been diagnosed with increasing frequency in children and young adult patients with congenital heart defect, especially in patients who have undergone corrective cardiac surgery related

with atrial tissue [1]. In addition, abrupt termination of a supraventricular tachycardia (SVT) can be associated with sinus pauses due to overdrive suppression of the sinus node [2] (Fig. 1). In the described case we faced the choice of implanting a cardiac pacemaker or treating the supraventricular tachycardia by ablation.



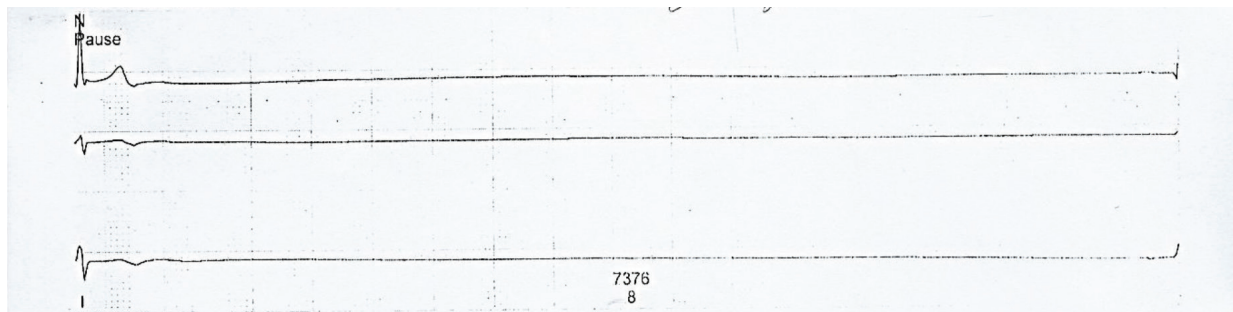
**Fig. 1 Sinus pause.**

An example of a sinus pause (4896 ms) after the termination of the supraventricular tachycardia recorded on Holter ECG monitoring

## Case report

We present a case of 16-years-old girl who had atrioventricular nodal reentrant tachycardia (AVNRT) soon after birth. At 3-years-old, she had an ablation of AVNRT (2008), after which the patient remained asymptomatic for a long

time. After 12 years the patient addressed with complaints to frequent episodes of rapid heartbeats followed by dizziness. We performed Holter ECG monitoring and found paroxysms of atrial tachycardia that ended with 970 sinus pauses > 2500 ms, the longest pause was 7376 ms (Fig. 2).



**Fig. 2 The longest pause.**

The pause of 7376 ms caused by sinus node asystole after an episode of supraventricular tachycardia, recorded in our patient on Holter ECG monitoring

We decided to avoid pacemaker implantation taking in consideration the young age and clear relationship between atrial tachycardia and sinus pauses. Our strategy was first to perform an electrophysiological study to diagnose the tachycardia type. Two diagnostic quadripolar catheters were placed into the high right atrium and the coronary sinus. A deflectable ablation catheter was used for mapping the atrial tachycardia.

The presence of atrial tachycardia originating from the ostium of the coronary sinus was demonstrated, during the

application of the radiofrequency currents, the tachycardia stopped, and the sinus rhythm was restored.

The patient was evaluated by the Holter ECG after 1 month and 6 months, and neither atrial tachycardia, nor sinus pauses were found. She is remaining asymptomatic.

## Discussion

Sinus node dysfunction with long sinus pauses is rare in children with structurally normal heart [1, 2]. There are a lot of data demonstrating that overdrive suppression of

the sinus node in the context of atrial fibrillation may result in sinus pause. This phenomenon is quite rare in children [3, 4]. Reports about adults have shown that ablation of the atrial fibrillation can lead to resolution of the sinus pauses. Some researchers reported the use of the same strategy in children [4].

After discussing with the parents and the patient all the possible management scenarios, we decided to manage the tachyarrhythmia with catheter ablation. The ablation was preferred over medication because of the potential risk of worsening of the bradycardia due to antiarrhythmic therapy. The decision was influenced by the fact that our patient supported ablation of AVNRT in the past, has a normal cardiac structure and function on echocardiography.

Pacemaker placement would have been a permanent intervention with possible future side effects such as infection, lead dislodgement, and cosmetic defect. Ablation was preferred as a definite procedure.

### Conclusions

Even in some young patients, paroxysmal SVT could be complicated with long sinus pauses. The optimal therapeutic solution should be directed towards the SVT treatment and not to the bradyarrhythmia. The majority of SVT could be cured by catheter ablation.

### Competing interests

None declared.

### Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

### Authors' contributions

All the authors have contributed equally at the results presentation in the paper.

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