Change in Atrial Activation Pattern during Ablation of Atrial Flutter

Mohammad Ali Akbarzadeh 1,2,* , Abolfath Alizadeh Diz 3, Negar Bahrololoumi Bafruee 4
1 Cardiovascular Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2 Department of Cardiology, School of Medicine, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3 Department of Pacemaker and Electrophysiology, Shaheed Rajaee Cardiovascular Medical and Research Center, Tehran University of Medical Sciences, Tehran, Iran
4 Razi Hospital, Tehran University of Medical Sciences, Tehran, Iran
* Corresponding author: Mohammad Ali Akbarzadeh, Cardiovascular Research Center, Shahid Modarres Hospital, Saadat Abad Street, Tehran, Iran. Tel: +98-9173171001, E-mail: akbarzadehali@sbmu.ac.ir

Abstract
Different types of supraventricular tachycardia have been reported in patients with history of surgical repair of Tetralogy of Fallot. This report presents appearance of focal atrial tachycardia during radiofrequency ablation of the cavotricuspid isthmus in typical atrial flutter.

INTRODUCTION
Supraventricular tachycardia occurs in about 20% of patients with previous surgical Tetralogy of Fallot (TOF) repair [1, 2]. Increased right atrial pressure due to chronic right ventricular pressure overload and anatomical obstacle due to atriotomy scar can cause atrial arrhythmias, mainly cavotricuspid (CTI)-dependent atrial flutter (AFL) and non-CTI-dependent AFL around the atriotomy scar or both [3]. Radiofrequency ablation of these arrhythmias has been reported in this group of patients. Electroanatomical mapping has an important role in identification of reentry circuits in patients with postoperative right atrial incisional scar and flutter and it is necessary to ablate both scar-related and typical AFL to prevent long-term recurrence [4].

CASE PRESENTATION
A 31-year-old man who performed total surgical correction of TOF at 5 years old, was referred for catheter ablation of persistent typical AFL. His baseline electrocardiogram revealed negative flutter waves in leads II, III, aVF, V5 and V6, and positive waves in lead V1 consistent with typical counterclockwise AFL and non-CTI-dependent AFL around the atriotomy scar or both [3]. Radiofrequency ablation of these arrhythmias has been reported in this group of patients. Electroanatomical mapping has an important role in identification of reentry circuits in patients with postoperative right atrial incisional scar and flutter and it is necessary to ablate both scar-related and typical AFL to prevent long-term recurrence [4].

DISCUSSION
Change of the first arrhythmia without restoration of the sinus rhythm can be described by different theories. It is probable that the second arrhythmia started de novo at the termination of the first arrhythmia. The other theory is that both arrhythmias were presented initially, but as the AFL rate was faster than the atrial tachycardia, the second arrhythmia could not be manifested. In this theory, one can argue that the mechanism of atrial tachycardia was microreentry (maybe around previous surgical scar of lateral atriotomy), so AFL
Figure 1: A) Termination of atrial flutter (300 ms) and appearing of focal atrial tachycardia (CL = 326 ms) during ablation of cavotricuspid isthmus. Note change of intracardiac sequence and cycle length, and P wave morphology. B) Termination of focal atrial tachycardia during radiofrequency application in lateral of right atrium. Signal in ablation catheter is 96 ms earlier than surface P wave.

entrained the cycle of the micro reentry, but could not terminate it, or if the mechanism of atrial tachycardia was automaticity, due to a lower rate, it was hidden under AFL. Although it is difficult to define the mechanism of a focal AT, some principles may help to find that. Initiation and termination with programmed atrial stimulation and insensitivity to adenosine can be in favor of reentrant mechanism. Criteria for entrainment may be useful to prove the mechanism of reentrant, but due to small circuit size, it is difficult to demonstrate. By the way, regardless of the mechanism of focal atrial tachycardia, ablation can be performed with mapping the tachycardia focus. In our case we did not try to find out the main mechanism and just found its focus and ablated it [6].

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CONFLICT OF INTEREST

None of the authors had any conflicts of interest.

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