

A rare complication of radiofrequency catheter ablation of left atrial tachycardia: atrial septal dissection and left atrial hematoma formation

Sol atriyal taşikardiye yönelik radyofrekans kateter ablasyonu sırasında nadir bir komplikasyon: Atriyal septal diseksiyon ve sol atriyum hematomu

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A 52-year-old man with left atrial tachycardia underwent radiofrequency catheter ablation. A steerable 4-mm-tip ablation catheter was advanced into the left atrium through a patent foramen ovale without transseptal puncture. However, the tip of the catheter was stuck in a structure. A pull-back maneuver rendered the catheter free and the procedure was cancelled. Transthoracic and transesophageal echocardiograms obtained immediately after the procedure showed intimal layer dissection in the interatrial septum and intramural hematoma formation throughout the anterior left atrial wall. The patient was in stable condition. Therefore, he was followed-up conservatively with serial echocardiographic examinations. The dissected intimal layer disappeared in 10 days and the hematoma underwent near-complete resolution in three months. This case highlights a rare complication of catheter ablation procedure that all interventionists should be familiar with.

Key words: Catheter ablation/adverse effects; echocardiography; heart septum; hematoma; tachycardia/therapy.

Radiofrequency catheter ablation procedure is performed in increasing frequency. It has become an established treatment modality for patients with refractory supraventricular tachyarrhythmias. Depending on the type of the procedure and the age of the patient, major complications occur in approximately 3% of patients undergoing electrophysiologic study and radiofrequency catheter ablation.^[1]

This case describes a very rare complication of radiofrequency catheter ablation in a patient with refractory left atrial tachycardia: left atrial dissection and subsequent hematoma formation.

Sol atriyal taşikardi nedeniyle 52 yaşında erkek hastaya radyofrekans kateter ablasyonu yapılmasına karar verildi. Yönlendirilebilir 4 mm uçlu ablasyon kateterinin, transseptal ponksiyon yapılmadan, foramen ovale açıklığı yoluyla sol atriyuma ilerletilmesi sırasında kateterin ucu bir yapı içine saplandı. Geri çekme manevrası ile kateter ucu serbestleştirildikten sonra işlem ertelendi. İşlemden hemen sonra yapılan transtorasik ve transözofageal ekokardiyografide, interatriyal septumda diseksiyon ile beraber sol atriyum duvarı ön yüzü boyunca hematoma gözlemlendi. Hasta stabil olduğu için seri ekokardiyografik takipler ile izlendi. Atriyal septumdaki diseksiyon tabakası 10 gün içinde kayboldu, hematoma ise üç ay içinde tama yakın gerileme gösterdi. Bu olgu sunumunda, tüm girişimsel kardiyologların aşına olması gerektiğini düşündüğümüz, kateter ablasyonunun nadir bir komplikasyonuna dikkat çekilmesi amaçlandı.

Anahtar sözcükler: Kateter ablasyonu/yan etki; ekokardiyografi; kalp septumu; hematoma; taşikardi/tehdavi.

CASE REPORT

Electrophysiological study and radiofrequency catheter ablation were planned in a 52-year-old Caucasian man with palpitations resistant to drug therapy. The patient had no other medical history. On cardiac auscultation, the patient was tachycardic and no murmur was heard. Blood biochemistry, hemogram, thyroid function tests were within normal limits. The 12-lead electrocardiogram showed a regular supraventricular rhythm with a ventricular rate of 135 bpm. On transthoracic echocardiography (TTE), the heart valves and chambers were normal. Coronary angiography

Received: June 11, 2009 Accepted: July 17, 2009

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showed nonsignificant lesions. The electrophysiological study revealed left atrial tachycardia with a cycle length of 210 msec and 2:1 block. Radiofrequency ablation within the left atrium was decided. A steerable 4-mm-tip ablation catheter (Mariner, Medtronic, Minneapolis, USA) was advanced through a patent foramen ovale (PFO) without transseptal puncture. However, the tip of the catheter was stuck in a structure making manipulation difficult and, in order to check its location, a small amount of contrast was given. Persistent dense opacification at the catheter tip suggested access into an inappropriate structure and the ablation procedure was withdrawn. A pull-back maneuver rendered the catheter tip free. The patient had mild chest pain that relieved spontaneously. There were no ischemic changes on the electrocardiogram. A control TTE revealed a cystic mass, 39 x 40 mm in size, in the interatrial septum. No pericardial effusion was noted. For better evaluation of the interatrial septum, left atrium, and periaortic region, transesophageal echocardiography (TEE) was performed, which showed a septated cyst-like mass and mural thickening (hematoma) measuring 21 mm and extending from the interatrial septum to the anterior left atrial wall (Fig. 1a, b). There was no communication between the atrial lumen and the mass on color Doppler examination. The patient was discharged upon observation of no symptoms. A control TTE performed 10 days later showed disappearance of the cystic component and regression of the mural thickening to 13 mm. Three months later, there was only minimal residual thickening on the anterior left atrial wall (Fig. 1c).

DISCUSSION

This case describes a rare condition in which the ablation catheter tip penetrated the potential space between the septum primum and septum secundum while passing into the left atrium through a PFO during percutaneous left atrial tachycardia ablation procedure. This catheter tip penetration resulted in intimal layer dissection and intramural hematoma formation within the left atrium. The patient was followed-up conservatively and near-complete resolution of the hematoma was observed within three months. Dissection of the interatrial septum is mainly associated with mitral valve surgery and its occurrence during percutaneous interventions is very rare. To our knowledge, three similar cases have been reported. In one case, the catheter perforated the interatrial septum during right heart catheterization in a two-year-old child.^[2] In another case, forceful injection of

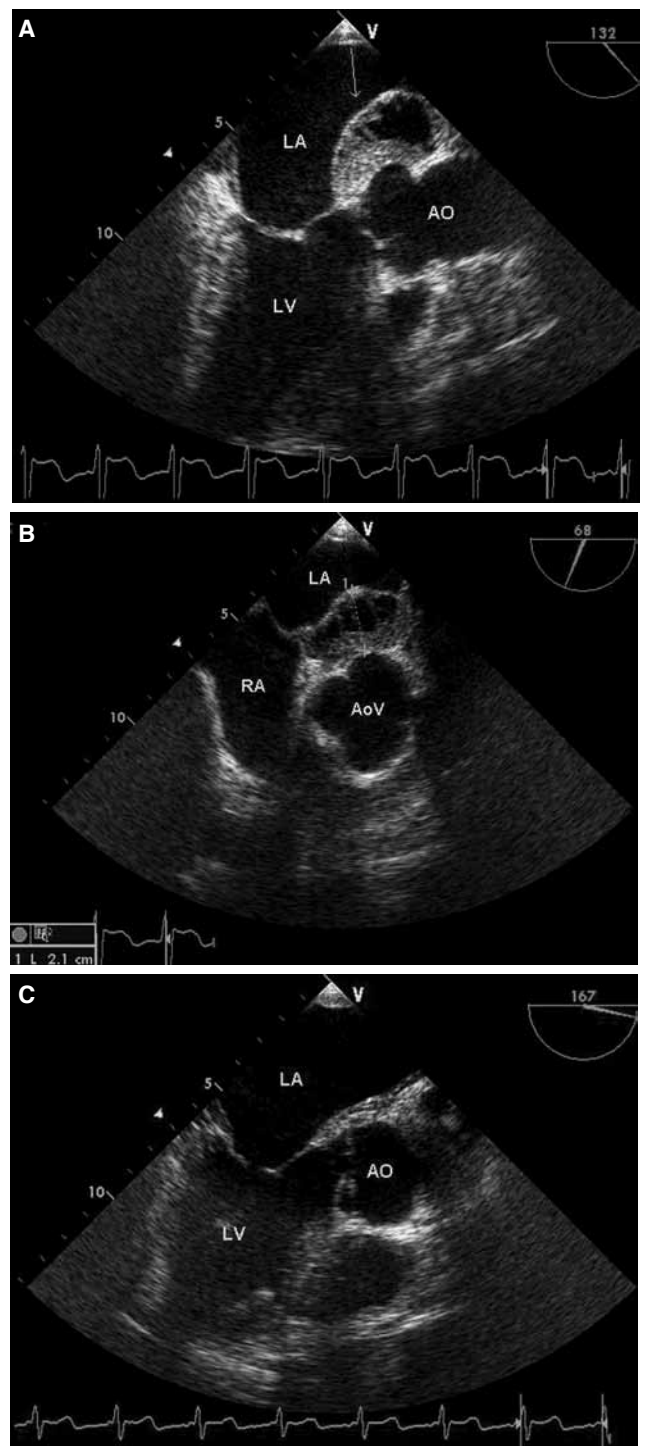


Figure 1. Transesophageal echocardiograms of the patient. Midesophageal aortic (A) long-axis and (B) short-axis views showing a septated mass (arrow) and mural thickening in the left atrial wall. (C) Midesophageal aortic long-axis view showing minimal residual thickening along the anterior left atrial wall. LA: Left atrium; LV: Left ventricle; AO: Aorta; AoV: Aortic valve.

contrast medium directly onto the septal rim caused a tear and dissection of the interatrial septum during right atrial angiography in a 56-year-old male. Atrial

septal swelling regressed in three weeks without any intervention.^[3] In the other case, the interatrial septum was dissected and the aorta was penetrated in a 38-year-old man during transseptal puncture for percutaneous transluminal mitral commissurotomy. The patient underwent emergency surgery with the catheter left in situ.^[4]

In the present case, catheter-induced trauma led to hematoma formation throughout the anterior left atrial wall. Intramural left atrial hematoma is a reported complication of catheter ablation for atrial tachyarrhythmias.^[5] The diagnosis can be made by TTE, TEE, cardiac computed tomography and cardiac magnetic resonance imaging. In order to avoid such complications, TEE or intracardiac echocardiography can be used to guide the transseptal catheterization procedure. In addition, a preinterventional echocardiogram may provide comprehensive information about the atrial septal morphology and presence or absence of a PFO. Puncture of an inappropriate structure can be confirmed by dye injection, but this can lead further separation of layers in case of atrial dissection. Inadvertent aortic root perforation is another potential complication following unrecognized atrial septal penetration. In this situation, emergency surgery should be performed without removing the catheter. In stable and asymptomatic patients with atrial septal dissection or hematoma, conservative approach with serial echocardiographic examinations seems to

be an appropriate strategy.^[2,5,6] This case highlights a rare complication of catheter ablation procedure with which all interventionists should be familiar.

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