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

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.

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
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dense opacification at the catheter tip suggested access into an inappropriate structure and the ablation procedure was withdrawn.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 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. 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.

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. 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. This case highlights a rare complication of catheter ablation procedure with which all interventionists should be familiar.

REFERENCES