CATHETER ABLATION

CASE STUDY

Successful Ablation of Focal Pulmonary Vein Atrial Tachycardia in a Patient with Constrictive Pericarditis

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ABSTRACT. Constrictive pericarditis is a medical condition characterized by a thickened, fibrotic pericardium, limiting the heart's ability to function normally. Atrial arrhythmias are a part of the natural history of constrictive pericarditis. The possible explanation for atrial arrhythmias is wall stress restricting the filling of the cardiac chambers. In this case, we present a young male with a history of constrictive pericarditis who underwent successful catheter ablation for focal atrial tachycardia originating from the right superior pulmonary vein.

KEYWORDS. atrial tachycardia, catheter ablation, constrictive pericarditis.

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Case presentation

A 27-year-old man complaining of palpitation and dyspnea was admitted to our clinic. Twelve-lead resting electrocardiography revealed irregular supraventricular tachycardia concomitant with atrial tachycardia (AT). The echo also revealed normal left ventricular systolic function (ejection fraction of 65%) and enlarged biatrial diameter (left atrium (LA) of 44 mm and right atrium (RA) of 41 mm). The patient was on β -blocker therapy (metoprolol of 50 mg). The patient was referred for electrophysiological study and catheter ablation. Ablation was performed under mild-to-moderate sedation without intubation. A steerable decapolar catheter was inserted into the coronary sinus for positional reference. During the catheter insertion, remarkable calcification of the pericardium was observed. The EnSite NavX system (St. Jude Medical, St. Paul, MN) was used for three-dimensional mapping and catheter navigation. Three-dimensional RA geometric reconstruction was

done. After burst atrial pacing AT with cycle length (CL) of 410 ms was initiated. Early atrial activations were detected in junction of the right superior vena cava (25 ms earlier than surface P-waves), and radiofrequency ablation (RFA) was performed. During RFA application, AT terminated; however, following the termination of RFA, AT resumed with the same P-wave morphologies and a slightly decreased CL of 450 ms initiated again (**Figure 1a**). Because of the anatomical proximity of the superior vena cava and left superior pulmonary vein, the AT from the RA-SVC junction may mimic that of the right superior pulmonary vein (RSPV). Therefore, a transseptal puncture was performed, and the earliest atrial activation (30 ms earlier than surface P waves) was found in the ostium of the RSPV (**Figure 1b**). RFA with an irrigated catheter (Cool Flex, St. Jude Medical, St. Paul, MN) was performed, after which AT terminated and did not recur. After a 30-min waiting period, the patient was given orciprenaline to induce tachycardia, but it was no longer inducible. The procedure was completed without complication. Fluoroscopy and procedure times were 10 min and 140 min, respectively. No recurrence of AT was detected during the 3-month follow-up period. A cardiac computed tomography (CT) was performed following the patient's discharge from hospital, and significant pericardial calcification was found (**Figure 1c–f**).

The authors report no conflicts of interest.

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Figure 1: (A) Intracardiac electrocardiograms showing termination of atrial tachycardia during radiofrequency ablation. (B) Three-dimensional reconstruction of both right and left atrium using EnSite NavX System. Ablation sites (brown lesions) at the RA and RSPV. SVC: superior vena cava; RA: right atrium; RSPV: right superior pulmonary vein; LA: left atrium; CS: coronary sinus. (C) Axial, (D), three-dimensional volume rendering, (E) coronary, and (F) sagittal views of computed tomography. Pericardial calcifications are depicted as arrows.

Commentary

The causes of pericardial calcification include infectious and/or inflammatory processes, post-surgical changes, previous trauma, prior myocardial infarction, and non-specific/idiopathic cases. Infectious causes of pericardial calcification include tuberculosis and various fungal, viral, and bacterial etiologies. More than half of patients with pericardial calcification will have constrictive pericarditis. The common treatment is surgical removal of the pericardium. There is no effective medical therapy, and the mortality rate is between 5% and 10%.¹ Atrial arrhythmias are usually a part of the natural history of constrictive pericarditis. The prevalence of these arrhythmias ranges from 25% to 30 %. The severity and duration of the disease can affect the chance of

developing atrial fibrillation.^{2,3} The most reasonable explanation for the development of atrial arrhythmias in constrictive pericarditis patients is wall stress restricting the filling of the cardiac chambers.

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