

Case Report

Acute Right Coronary artery Occlusion During Cooled-Tip Radiofrequency Ablation of the Cavotricuspid Isthmus

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Abstract

Cooled-tip radiofrequency catheter ablation of the cavotricuspid isthmus, performed after pulmonary vein isolation, resulted in acute occlusion of the posterolateral branch of the right coronary artery in a 49-year-old male with previously known right coronary artery disease. The occlusion was successfully stented. It is conceivable that previously diseased coronary arteries are more prone to be damaged during ablation.

Introduction

The incidence of coronary injury secondary to radiofrequency catheter ablation (RFA) procedures in patients with atrial arrhythmias is very low [1]. The cavotricuspid isthmus (CTI) is the target of typical atrial flutter (AFL) ablation. Despite the proximity of the right coronary artery (RCA) to the CTI, only few reports of direct damage to the RCA resulting in myocardial infarction (MI) during CTI catheter ablation have been published [1-5]. There is controversy whether to use conventional or irrigated tip catheters for CTI ablation. However, since most atrial fibrillation ablation procedures are performed with irrigated tip catheters it is tempting to use this type of catheters when CTI ablation is performed as part of an atrial fibrillation ablation procedure. We report a case in which acute occlusion of the RCA occurred in this context.

Case Report

A 49-year-old man, truck driver, with a history of hypertension, non-insulin-dependent diabetes, obstructive sleep apnea and coronary disease (stent implanted at the RCA two years before), was referred to our institution for catheter ablation. He complained of recurrent episodes of palpitations and dizziness during the previous six months, unresponsive to atenolol (50 mg/d). He presented one episode of syncope preceded by palpitations on atenolol. The ECG showed sinus bradycardia, and the Holter ECG documented multiple symptomatic episodes of paroxysmal atrial fibrillation (AF) and typical AFL. Transthoracic echocardiography and treadmill test were normal.

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A decision was made to proceed with catheter ablation of AF as well as CTI ablation. The patient underwent electrical isolation of the 4 pulmonary veins under general anesthesia, using three-dimensional electroanatomic imaging (NavX, St. Jude Medical, St Paul, Minnesota USA). We used a 3.5 mm-tip external irrigated ablation catheter (EZ Steer™ ThermoCool® Catheter, Biosense Webster, Diamond Bar, CA), and a powered controlled setting (Atakr® II Generator, Medtronic), with a maximum power of 35 W (30W for the posterior wall of the left atrium) and a temperature limit of 43°C. The procedure was successful and isolation of the four pulmonary veins was obtained without complications. The same catheter was used later for the CTI ablation with the same parameters. RFA of the CTI was performed in a point by point fashion during sinus rhythm. After 7 applications, bidirectional isthmus block was achieved. Immediately after documentation of CTI block, we noted sudden PR prolongation with ST-segment elevation in the inferior leads followed by progressive second degree AV block (Figure 1, panels A-C).

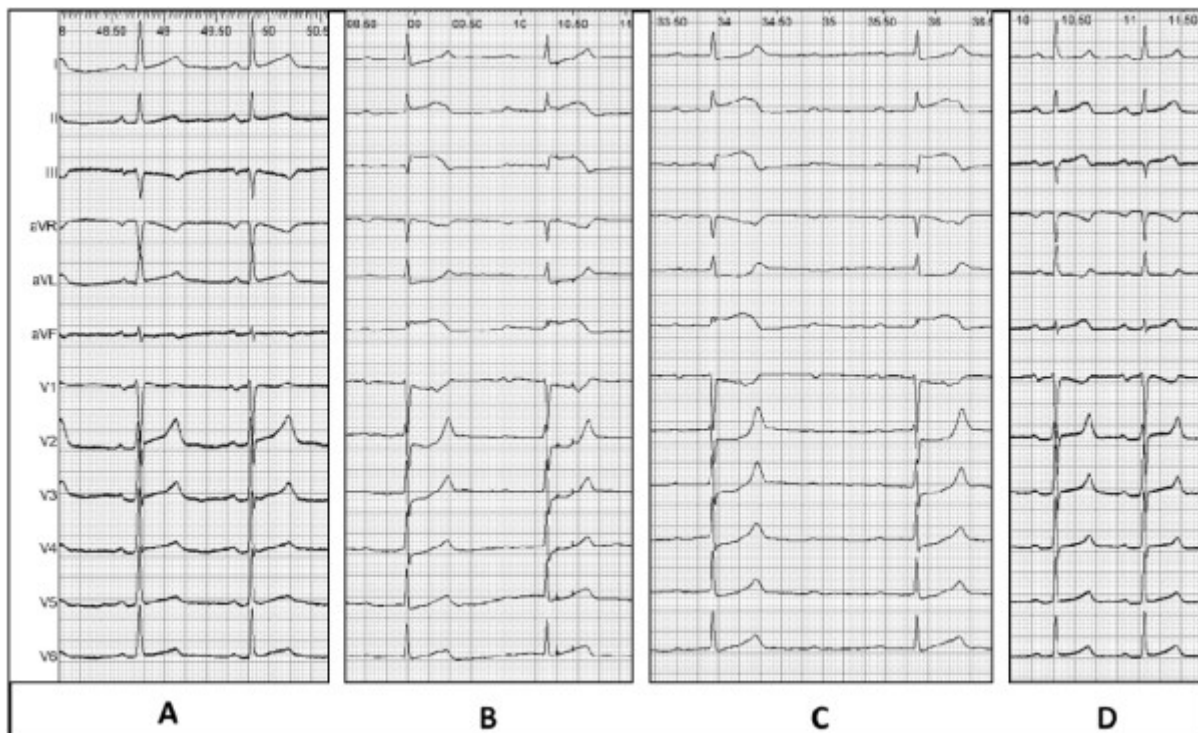


Figure 1: Twelve-lead ECGs: A, at the beginning of the procedure B, at the end of the ablation procedure: note the PR prolongation and the ST-segment elevation, particularly prominent in lead III and aVF. C, 2 minutes after ablation, showing advanced AV block, and more prominent ST-segment elevation. D, after coronary revascularization with normalization of the ST elevation

A tetrapolar electrode was positioned at the apex of the right ventricle for temporary pacing, and the other catheters were removed. A coronary angiogram was performed, showing no restenosis at the stent previously implanted at the proximal RCA and a total occlusion of the origin of the posterolateral branch of the RCA by a recent thrombus (Figure 2). The RCA was extensively calcified. A guidewire was introduced and the vessel was dilated; a drug-eluting stent was implanted with restoration of distal blood flow of the posterolateral branch. The patient recovered a normal AV conduction with normalization of the ST segment (Figure 1, panel D). Troponin C peaked at 1.61 ng/mL the following day. The echocardiogram before discharge showed a mild inferior wall hypokinesia and normal left ventricular ejection fraction.

Enoxaparin, aspirin and clopidogrel, were given after the procedure. Enoxaparin was later substituted by acenocumarol. The clinical course was uneventful. Six months later, the patient was asymptomatic without further episodes of recurrent AF or AFL.

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