JOURNAL OF COMMUNITY HOSPITAL INTERNAL MEDICINE PERSPECTIVES
2020, VOL. 10, NO. 4, 358–360
https://doi.org/10.1080/20009666.2020.1780677

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CASE REPORT

Coronary artery occlusion following low-power catheter ablation

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ABSTRACT

Myocardial infarction (MI) is an unusual but potentially serious complication of catheter ablation procedures. This case describes the occurrence of acute myocardial infarction following low-power ablation in a young patient and highlights the importance of maintaining high index of suspicion following catheter ablation irrespective of the ablation power used. A 22-year-old patient had low-power ablation of the right posteroseptal accessory pathway in the ostium of the coronary sinus on account of persistently symptomatic WPW syndrome with orthodromic re-entrant tachycardia. Two hours after the procedure, she developed moderately severe chest pain. Electrocardiogram showed ST elevation in the inferior leads. Coronary angiography showed 100% stenosis of the right coronary artery just beyond the posterior descending artery. She failed balloon angioplasty and a drug eluting stent was placed in the posterolateral branch of the right coronary artery. The symptoms resolved and follow up echocardiogram showed normal left ventricular systolic and diastolic functions with no regional wall motion abnormality. This case demonstrates the occurrence of MI following low-power catheter ablation. Patients should be monitored for this complication irrespective of the ablation power used.

ARTICLE HISTORY
Received 17 February 2020
Accepted 5 June 2020

KEYWORDS
Ablation; coronary; infarction; myocardial; occlusion

1. Introduction

Catheter directed radiofrequency ablation (RFA) is an effective and safe option for the treatment of re-entrant tachycardias associated with Wolff-Parkinson-White syndrome. It is especially indicated in patients who remain symptomatic despite medical treatment [1]. Catheter ablation is generally a safe procedure with complication rates ranging from 2–5% [2]. Myocardial infarction as a complication is even less commonly reported, especially in young patients with no known risk factor for coronary artery disease [3]. This case describes the occurrence of myocardial infarction as a complication of low power ablation in a young patient.

2. Case description

We report the case of a 22-year-old Caucasian woman with history of recurrent palpitation and episodic dizziness of about one-year duration. She was diagnosed with Wolff-Parkinson-White syndrome with orthodromic re-entrant tachycardia. She was initially treated medically. Due to persistence of symptoms, the patient opted to undergo catheter directed RFA of the accessory pathway. Elective ablation of the right posteroseptal accessory pathway was performed in the ostium of the coronary sinus using TactiCath catheter system at a set power of 30 Watts for 30 seconds with immediate disappearance of conduction along the accessory pathway. Two hours later, she started experiencing retrosternal chest pain. The chest pain was continuous, moderately severe and non-radiating. There was no palpitation, shortness of breath, orthopnea, paroxysmal nocturnal dyspnea, cough or leg swelling. She did not have nausea, vomiting or abdominal pain. She had never smoked cigarettes, taken alcohol or used recreational drugs. There was no personal or family history of coronary artery disease or stroke. On examination, heart rate was 88 beats per minute, blood pressure 90/62 mmHg. She had normal heart sounds with no murmur or pedal edema. Electrocardiogram showed ST elevation in the inferior and lateral leads with reciprocal changes. Troponin-1 was elevated at 52.93 ng/ml. She subsequently had emergent cardiac catheterization. Coronary angiography revealed 100% stenosis of the right coronary artery just beyond the posterior descending artery (Figure 1). The other artery systems were normal. After multiple failed attempts to restore blood flow with balloon angioplasty, a drug eluting stent was eventually placed in the posterolateral branch of the right coronary artery. TIMI-3 flow was restored (Figure 2). The procedure was well tolerated with resolution of chest pain and normalization of the electrocardiogram. Follow up echocardiogram also showed normal left ventricular systolic and diastolic functions with no regional wall motion abnormality. The patient was monitored in the cardiac care unit and subsequently discharged home.

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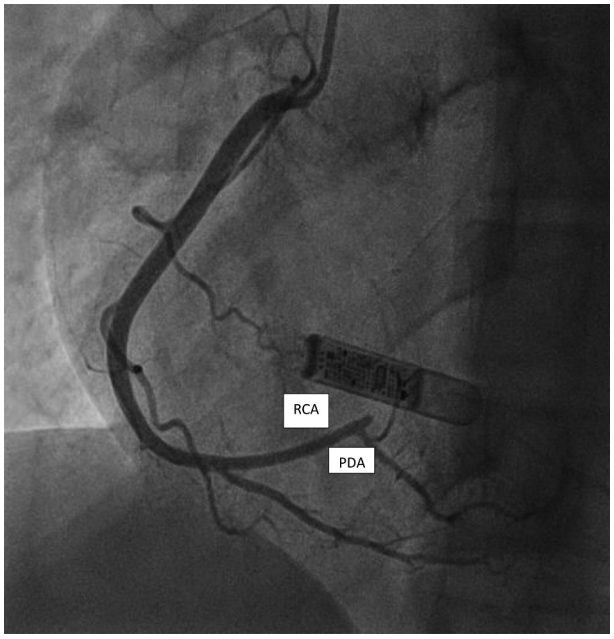

Figure 1. Complete stenosis of the right coronary artery.
RCA: Right coronary artery.PDA: Posterior descending artery.

3. Discussion

Catheter directed RFA has been deployed to great success in the treatment of many types of persistent arrhythmias including ventricular tachycardia and the different types of re-entrant tachycardias [4]. Myocardial infarction, especially infarction in the territory of the right coronary artery is an unusually reported complication of catheter ablation [5]. It results from thermal injury to blood vessels near the ablation sites. This leads to stenosis and eventual occlusion of the affected blood vessels and subsequent loss of blood supply to the arterial territory. Very rarely, there have been instances of coronary artery perforation resulting in myocardial infarction [3]. The most commonly cited determinants of such complications include the power, duration and site of ablation [2].

Anatomically, the main coronary arteries and their branches are typically in close proximity to the ablation sites [6]. The coronary sinus, a major ablation site has been found to be very close to the right coronary arterial system in a significant proportion of the patient population [6]. In adults undergoing catheter ablation for accessory pathways, a study located a coronary artery within 2 mm of the coronary sinus or its tributaries in over 60% of the

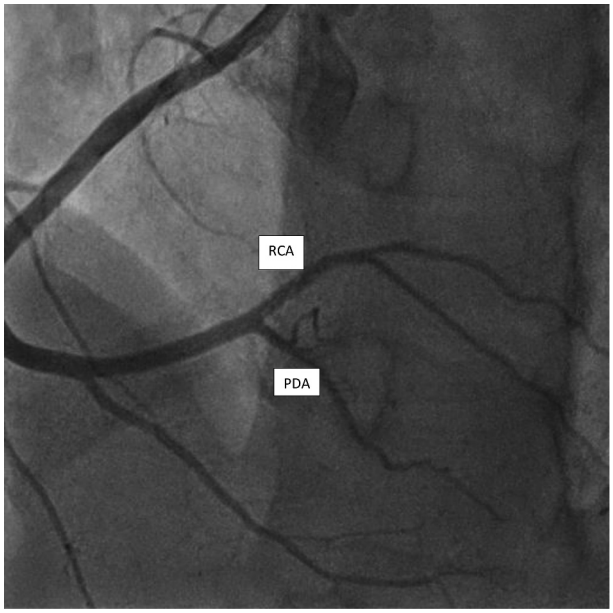

Figure 2. Recanalized right coronary artery.
RCA: Right coronary artery.PDA: Posterior descending artery.

population. In addition to the above, unanticipated variation in the anatomy of the coronary arteries may place the arteries in direct line for damage during the ablation procedure [7].

Histological effects of catheter ablation on coronary arteries include extracellular matrix proliferation in the media, luminal thrombosis and rarely medial hyperplasia [8]. Perivascular edema and stenosis have also been reported in the immediate post ablation period. The specific impact of ablation on coronary arteries appears to depend both on the proximity and spatial relationship between the particular blood vessel and the ablating electrode [8].

Most of the patients, like the illustrated case present with symptoms in the immediate post ablation period but delayed presentation up to two weeks have been reported [9]. Some researchers have demonstrated asymptomatic persistent coronary artery injury in animal studies [9]. Self-limiting chest pain and ST elevation on electrocardiogram have also been reported, these are usually secondary to transient vasospasm after catheter ablation [10].

The present case illustrates the role of prompt diagnosis and utilization of percutaneous coronary intervention techniques including deployment of stents to achieve favorable outcomes in the event of this uncommon but serious complication of catheter ablation.

In conclusion, clinicians need to maintain high index of suspicion and also educate the patients to recognize the features of myocardial infarction after undergoing an ablation procedure. This should be done irrespective of the duration, site or power of ablation. The possibility of coronary artery occlusion, its implications and consequences should be considered and discussed with the patients prior to the procedure.

Disclosure statement

No potential conflict of interest was reported by the authors.

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