Zero-fluoroscopy catheter ablation of focal atrial tachycardia in a pregnant woman with tachycardia induced cardiomyopathy

Kateterska ablacija fokalne preddvorne tahikardije pri nosečnici s tahikardno kardiomiopatijo brez obsevanja

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Abstract

Introduction: Occurrence of tachycardias increase during pregnancy in line with the increased propensity to ectopic activity.

Case presentation: We present a case of a 30-year-old woman in the 18th week of pregnancy with atrial tachycardia and tachycardia-induced cardiomyopathy that was successfully treated with zero fluoroscopy catheter ablation.

Discussion: The described method is safe and efficient and could be used in the future when drug refractory tachycardias occur during pregnancy.

Izvleček

Uvod: Incidenca tahikardij se med nosečnostjo povečuje zaradi večje nagnjenosti k ektopični aktivnosti.

Prikaz primera: Predstavljamo primer 30-letne nosečnice v osemnajstem tednu nosečnosti s preddvorno tahikardijo in tahikardno kardiomiopatijo, ki je bila uspešno zdravljena s katetersko ablacijo brez izpostavljanja sevanju.

Razpravljanje: Opisana metoda je učinkovita in varna in bi bila lahko v prihodnosti primerna za zdravljenje na zdravila odpornih tahikardij v nosečnosti.

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1. Introduction

It is known that the cardiovascular system undergoes significant potential proarrhythmogenic changes in adaptation to pregnancy (1). Thus, occurrence of tachycardias may increase during pregnancy in line with the increased propensity to ectopic activity. When tachycardias become incessant and can not be controlled with therapeutic interventions there is increased risk for deve-

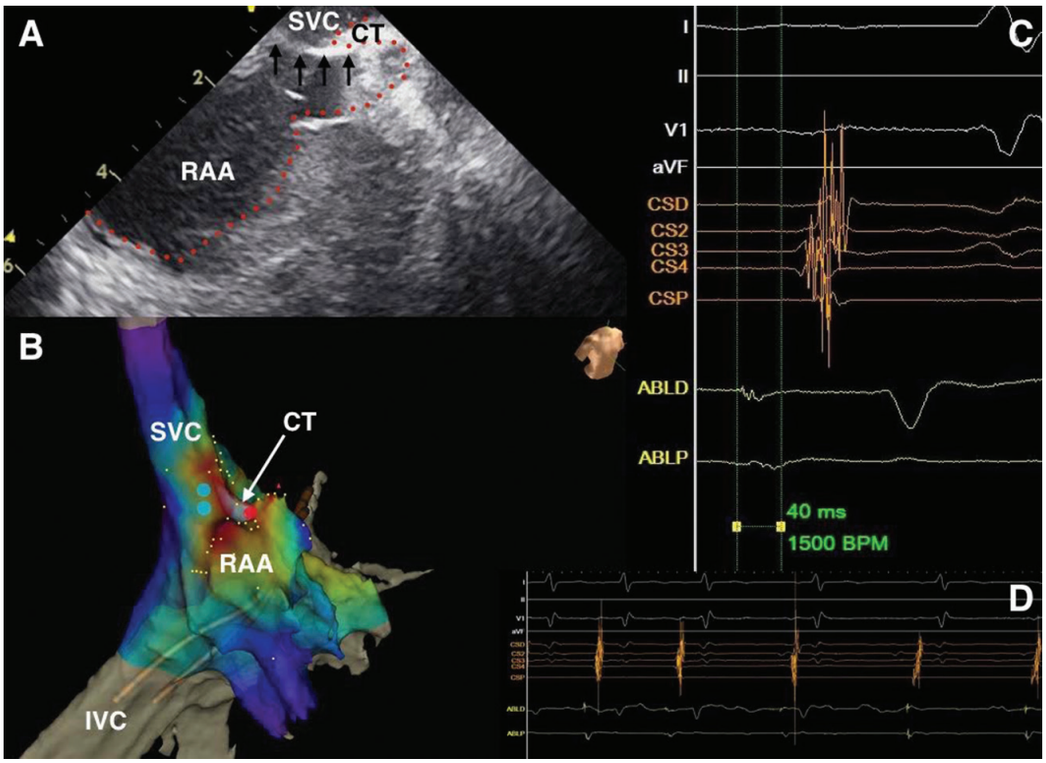

Figure 1: (A) Part of the right atrium is shown on this intracardiac echocardiography image. Atrial wall is demarcated with a red dotted line. Crista terminalis (CT), superior caval vein (SVC) and body of the right atrial appendage (RAA) are shown. Black arrows mark the tip of the ablation catheter hooked at the edge of the CT from the appendage side - site of the final successful ablation. (B) Partial 3D-EAM activation map of the right atrium is shown. White colour represents the area of the earliest endocardial electrograms recorded during ongoing atrial tachycardia. Blue dots represent the transiently successful ablation site at the crista terminalis. The red dot represents the final successful ablation site as shown on panel A. SVC represents superior caval vein, other abbreviations are the same as on panel A. (C) The earliest endocardial electrogram (channel ABLD) recorded at the final successful ablation site was 40 ms early with respect to the beginning of the P wave on the surface electrocardiogram tracing. (D) Termination of atrial tachycardia at the final successful ablation site seconds after the start of the ablation is shown.

lopment of tachycardia-induced cardiomyopathy.

2. Case presentation

A 30-year-old woman in the 18th week of her first pregnancy was admitted to our department for electrophysiology study. She had a history of atrial tachycardia with tachycardia-induced cardiomyopathy four years before the pregnancy. In the past she was successfully treated with propranolol which was later replaced with bisoprolol. Antiarrhythmic drug treatment was discontinued due to patient preference and improvement of systolic function of the left ventricle. At the beginning of her pregnancy she complained of palpitations, dizziness and nausea. Atrial tachycardia with heart rate of approximately 200 beats per minute (bpm) was recorded on a 12-lead

electrocardiogram (ECG). Systolic dysfunction of the left ventricle was observed on echocardiography (ejection fraction 47 %). The resumed treatment with bisoprolol was unsuccessful. Numerous tachycardia episodes with a heart rate of 200 bpm were observed on the 24-hour ECG monitoring, median heart rate was 119 bpm.

Neither fluoroscopy nor sedation were used for the procedure. We performed percutaneous femoral vein puncture and inserted a 10-lead electrophysiology catheter (Polaris X™, Boston Scientific) into the coronary sinus and an irrigated tip ablation catheter (CoolFlex™, St. Jude Medical) was placed into the right atrium. After continuous isoprenalin infusion there was spontaneous occurrence of sustained atrial tachycardia. A 3D – electroanatomic mapping (EAM) model (Ensite/NavX™, St. Jude Medical) with activation mapping of the right atrium was created (Figure 1B). The origin of the focal atrial tachycardia was found on the cranial part of the crista terminalis where radiofrequency ablation was performed with 40 W (Figure1A). The ablation terminated the tachycardia within 10 seconds, however the effect was only transient as tachycardia recurred a few minutes later. Subsequently, intracardiac echocardiography (ICE) probe (Acunav™, Biosense Webster) was inserted into the right atrium. With the aid of the intracardiac echocardiography the ablation catheter tip was guided into the cranial part of the right atrial appendage ostium at the location opposite to the previous transiently successful ablation site on the crista terminalis. At the described location the ablation with 35W was successful within seconds. Tachycardia did not recur during the 30 minute waiting period despite repeated challenge with isoprenaline and fast atrial pacing (Figure 1D). The patient had no palpitations during the one month follow-up period. 24-hour ECG monitoring revealed no atrial tachycardias and systolic function of the left ventricle improved to near normal.

3. Discussion

Treatment of atrial tachycardias during pregnancy is generally challenging due to their drug-refractory nature and tendency to be persistent. When supraventricular tachycardias can not be controlled with antiarrhythmic drugs, catheter ablation is the treatment of choice (2). This seems particularly true when tachycardia-induced cardiomyopathy is present. However, X-ray exposure during catheter ablation may be potentially harmful for the fetus. For a typical procedure, the calculated average radiation dose to the fetus is < 1 mGy. This poses an estimated risk for the fetus to develop cancer at rates of 14.5, 30 and 55.7 per million cases for first, second and third trimester, respectively. Radiation also increases the estimated risk for hereditary effect in the next generation at rates of 1.5, 3.0 and 5.6 per million cases for first, second and third trimester, respectively (3).

There are few reports of zero and near-zero fluoroscopy catheter ablation for the treatment of focal atrial tachycardia during pregnancy (4,5). In our case, we successfully combined the use of the 3D-EAM system and the ICE to treat focal atrial tachycardia originating from the appendage side of the crista terminalis without the use of fluoroscopy. The described method seems safe and effective and could be used in the same manner in the future when drug refractory tahcycardias occur during pregnancy.

The patient gives her consent to the publicatio1n of the article.

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