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Radiofrequency Catheter Ablation of Premature Ventricular Contractions Originating from Anterior Interventricular Septum in a Patient with Left Ventricular Diverticulum: A Case Report

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July 6, 2020

Abstract

Premature ventricular contractions (PVCs) originating from anterior interventricular septum is frequent and can be cured by radiofrequency catheter ablation (RFCA). Left ventricular diverticulum (LVD) often correlates with ventricular tachyarrhythmias and produces a higher risk of sudden cardiac death. Here, we report the case of a 29-year-old woman with a rare combination of PVCs originating from anterior interventricular septum and LVD who successfully received RFCA.

Introduction

Premature ventricular contractions (PVCs) originating from anterior interventricular septum, while often being classified as an idiopathic ventricular arrhythmia, is not infrequent, and can be cured effectively and securely by radiofrequency catheter ablation (RFCA) with rare complications.[1-4]Left ventricular diverticulum (LVD), deemed as a rare cardiac malformation, often correlates with complex re-entrant ectopy and ventricular tachyarrhythmias, and produces a higher risk of sudden cardiac death.[5,6]After review work of medical literature, and to our knowledge, this is the first case of successful RFCA of a rare combination of PVCs originating from anterior interventricular septum and LAD.

Case report

A 29-year-old female was admitted for catheter ablation of idiopathic PVCs on account of a 2-year history of palpitations. Holter monitoring recorded 30090 PVCs in 24 hours accompanied by several nonsustained ventricular tachycardiac. Her laboratory data were normal, and an echocardiography done during hospitalization showed LVD and no other evidence of abnormity in both left and right ventricles. She had no history of congenital heart disease and denied family history of sudden deaths. PVCs exhibited a left superior axis QRS morphology with an rsR' pattern in I, rS pattern in lead II, III and aVF, qR pattern in aVR, R pattern in aVL and QS pattern in V1-V6 in the standard 12-lead electrocardiogram (ECG) (Figure 1A). Mapping was primarily performed in the anterior interventricular septum in proximity to apex in right ventricle using TactiCath^{TM} Quartz Contact Force Ablation Catheter (St. Jude Medical, MN, USA) under the guide of Ensite electroanatomic mapping system (St. Jude Medical, MN, USA) via the right femoral vein. The activation mapping revealed the earliest site of ventricular activation in PVCs, 14 msec earlier than the QRS complex on the surface ECG (Figure 1B). Pace mapping produced a similar QRS complex compared to that in PVCs, which further certified the target site (Figure 1C). However, the catheter ablation around this site reduced the amount of PVCs but failed to eliminate the PVCs. Transseptal puncture allowed the catheter mapping in the in left ventricle. The earliest ventricular activation that preceded the QRS onset on the surface ECG by 16 msec was recorded from the distal electrode pair of the mapping catheter in the anterior interventricular septum adjacent to apex in left ventricle, and pacing from that site displayed a

perfect QRS complex (Figure 2A, 2B). The PVCs disappears with RFCA of maximum power of 25W and maximum temperature of 43° C. Left ventricular angiography revealed left ventricular diverticulum, where the target site was exactly located (Figure 3A, 3B). No PVCs presented in 30 minutes after ablation and tachycardiac was not induced by repeated programmed electrical stimulation before removing all catheters and sheaths. There was no recurrence of PVCs in subsequent 3 months of follow up according to the result of a 24h Holter.

Discussion

Mapping and RFCA technology are proved to be feasible and effective in eliminating PVCs, while PVCs originating from anterior interventricular septum with LVD, rarely reported in medical literature, has not been fully discussed. The various electrophysiological characteristics of the PVCs originating from the left ventricular septum compared with those from the classical fascicular sites, together with the anatomic variance by LVD, enhanced the difficulty and probability of complication of the proven technology. In this case, the amount of PVCs decreased after ablation in right ventricle near the LVD, full elimination of which was performed by ablation in the opposite site in left ventricle. The rationality of the site of the PVCs origin was considered to be located adjacent to the LVD was certified by the ablation procedure, plus the mapping and radiography image. For PVCs originating from interventricular septum, when we can't successfully eliminate it in the left or right ventricular, it is a common strategy to make attempts to ablate on the corresponding target in the other ventricular. Especially for patients with anatomic variation on interventricular septum, we can try to conduct ablation near the area of malformation under safe premise. There-dimensional mapping systems can enhance the safety, as well as precision and accuracy of the procedure. This case demonstrated RFCA of PVCs originating from anterior interventricular septum in a patient with LVD.

Conclusion

To our knowledge, this case is the first to report successful RFCA of PVCs originating from anterior interventricular septum in a patient with LAD.

Conflict of interests

The authors report no financial relationships or conflicts of interest regarding the content herein.

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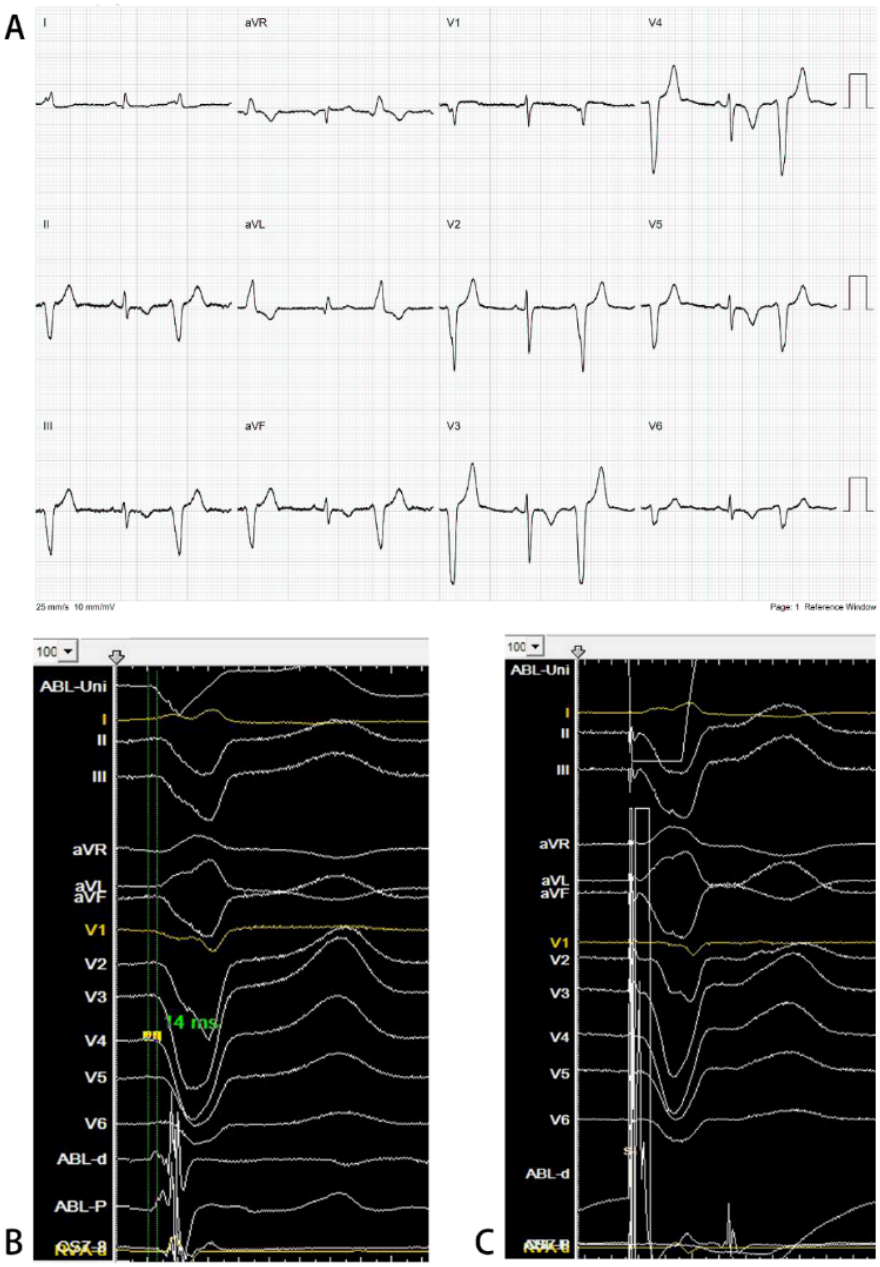

Figure 1. (A) The 12-lead electrocardiograms obtained during the PVCs. (B) Earliest site of ablation showed 14 ms earlier than the QRS complex on the surface ECG. (C) Pace mapping of the target site.

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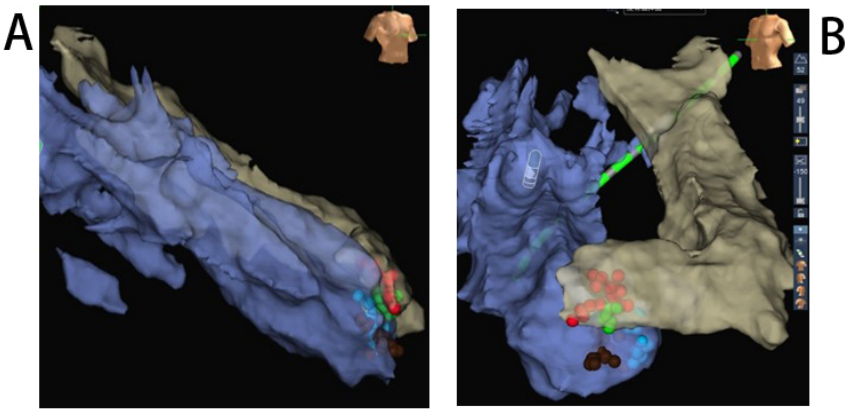

Figure 2 (A) The target in right anterior oblique (RAO) 30° of electroanatomic mapping system. (B) The target in left anterior oblique (LAO) 45° of electroanatomic mapping system.

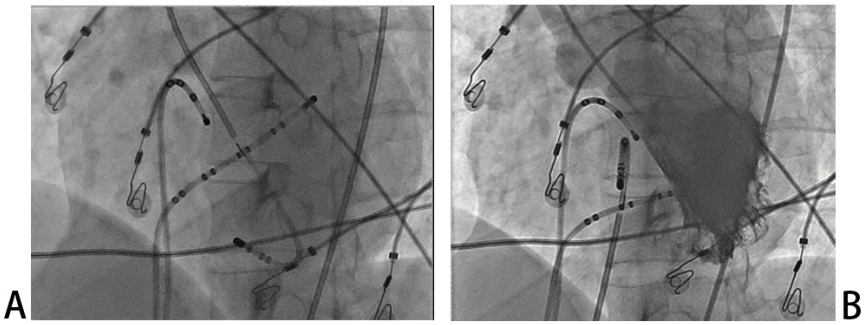

Figure 3 (A) The target in left anterior oblique (LAO) 45° of left ventricular angiography. (B) Left ventricular angiography

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