

## **Special Report**

### **Premature Ventricular Contractions Originating from the Vicinity of the Left Main Coronary Artery: Ablation or Abandon?**

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#### **INTRODUCTION**

A 51-year-old female presented with premature ventricular contractions (PVCs) originating near left main coronary artery (LMCA). The PVCs were successfully abolished at the bottom of left aortic sinus which was far away the ostium of LMCA about 5 mm without complications by a step-wise incremental energy application. The patient remained free from PVCs during 24-month follow-up. The most important to caution, ablation should never be performed within LMCA, there was a risk of dissection simply from cannulating this vessel.

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## **CASE REPORT**

A 51-year-old female presented with frequent premature symptomatic ventricular contractions (PVCs) originating from left ventricular outflow tract (LVOT). At baseline, frequent PVCs were observed in a bigeminal fashion with a coupling interval of 360 msec and QRS width of 160 ms. A total number of 39 874 PVCs per day were observed on the 24-hour ambulatory Holter monitoring in spite of the prophylactic oral administration of mexiletine (450 mg/day). Cardiac examinations including echocardiography, left ventriculography, and coronary angiography showed no structural heart disease.

Informed consent was obtained after explanation concerning radiofrequency catheter ablation (RFCA). Activation mapping of the clinical PVCs demonstrated equally early timing (18 ms) with respect to the onset of the QRS complex, from the distal coronary sinus and from the left aortic sinus through a three-dimensional mapping system (Carto XP, Biosense Webster, USA). The earliest activation site (EAS) was identified in the left main coronary artery (LMCA) where a ventricular electrogram preceding the QRS by 32 msec was recorded (Figs. 1, A, B). By coronary angiography, we confirmed that the EAS come from LMCA (Figs. 1, C, D).

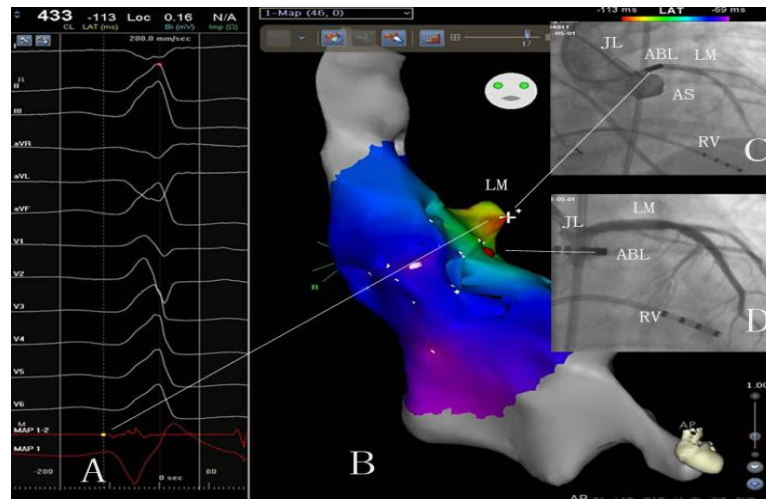


Figure 1: Activation map using a three-dimensional mapping system and endocardial electrograms.

The A panel show endocardial electrograms of the earliest activation site. Shown from top to bottom are surface ECG leads, ABL, and RV lead. A ventricular electrogram preceding the QRS by 32 msec were recorded at the earliest activation site.

The B panel shows an activation map of left ventricle outflow tract through a three-dimensional mapping system in which the earliest activation site originates from the LM region (P-A view).

The C and D panel shows that the location of ablation catheter tip observed in the LAO fluoroscopic views (in the LM, and the bottom of left aortic sinus respectively).

AS – aortic sinus; ABL – ablation catheter; LM – left main coronary artery; JL – Judkins left coronary catheter; RV– right ventricle catheter

What to do next, Ablation or Abandon?

To avoid damaging the coronary artery, we withdrew the catheter tip into the left aortic sinus and to the point which is far away the ostium of LMCA about 5 mm and where a ventricular electrogram preceding the QRS by 18 msec was recorded during PVCs. During pace mapping performed from the ablation catheter, a perfect pace map was obtained.

Although there had been no previous reports regarding an established method to eliminate PVCs originating from the vicinity of LMCA (1), we decided to apply the method advocated by Haissaguerre (2) to the present case, in which a step-wise incremental application of the RF energy was performed from 15 W to maximum 30 W using an open-irrigation catheter with temperature limit 43 °C, irrigation flow 17 mL/min.

Ablation was performed in an arc like fashion around these bipolar electrodes on the Lasso with early activation using a 3.5 mm irrigated ablation catheter (Thermocool, Biosense Webster) and using careful power titration (up to 30 W) and impedance monitoring. After reaching 30 W energy, the PVCs suddenly disappeared and became completely abolished. The RFCA was then continued for 120 s. No procedure-related complications were observed. The patient had been free from any PVCs without any medications during 24-month follow-up.

## **DISCUSSION**

The main findings of this study were that, firstly, the frequent PVCs originating from the vicinity of LMCA could be successfully eliminated at the bottom of left aortic sinus. Secondly, a step-wise incremental application of the RF energy could abolish the PVCs safely.

The onset of negative unipolar activation did not appear simultaneous with the earliest bipolar activation, which probably indicated a deeper site of that origin, called the

area of LV summit (3). Some ventricular tachycardia arising from the area were difficult to ablate by RFCA (3), especially inaccessible superior portion (4). This was a reason why irrigated-tip ablation with moderate power level was required for PVC elimination. A previous study demonstrated that ventricular tissues may extend to the top of valve annulus and a preferential pathway may be formed (5) . This suggested that PVCs with earliest recorded activation from the LMCA can be abolished in the aortic sinus successfully.

Potential mechanisms might be reentrant. Reproduction of PVCs in regions of abnormal signals with a delay, reset responses and subthreshold stimulation termination in regions of delayed activation suggest reentry as the mechanism. The mapping and ablation was at critical zone of a circuit at a distance from the early activation site (6).

The most important to caution, ablation should never be performed within LMCA and there is a risk of dissection simply from cannulating this vessel.

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