

第 14 回 特発性心室細動研究会 (J-IVFS)

日 時 : 平成 28 年 2 月 13 日 (土) 13:00-16:15

場 所 : 東京・大手町サンケイプラザ 4F ホール

(東京都千代田区大手町 1-7-2 Tel : 03-3273-2257~9)

～ 抄録集 ～

基調講演

Catheter ablation for the patient with Brugada syndrome and early repolarization syndrome

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The underlying electrophysiologic mechanism that causes an abnormal electrocardiogram (ECG) pattern and ventricular tachycardia/ventricular fibrillation (VT/VF) in patients with the Brugada syndrome (BrS) remains controversial. However, several studies have indicated that the right ventricular outflow tract (RVOT) is likely to be the site of electrophysiological substrate. My colleagues and I have found that in patients with BrS who have frequent recurrent VF episodes, the substrate site is indeed located at the RVOT but exclusively over the epicardium and not at the endocardium. Abnormal electrograms characterized by low-voltage fractionated late potential are present at the anterior RVOT epicardium of such BrS patient. More importantly, these abnormal electrograms are associated with epicardial surface and the interstitial fibrosis and reduced gap junction expression. Catheter ablation at these areas abolishes the BrS phenotype and life-threatening arrhythmias. BrS also associates with increased collagen throughout the heart. Thus it is very likely that abnormal myocardial structure and conduction are the underlying causes of electrophysiologic derangement in the BrS patients.

The different findings were found in patients with early repolarization syndrome (ER) who had frequent VF episodes. In ER, trigger and initiator of VF are associated with abnormal Purkinje sites at the septal areas and inferior walls. There were no epicardial substrates unless there was a presence of concomitant BrS pattern. Catheter ablations of these triggers and abnormal Purkinje sites are effective in preventing VF recurrences.

In my talks, I would discuss in details my experiences of catheter ablations in over 40 patients with BrS and 11 patients with ER as well as underlying pathophysiologic mechanisms of both BrS and ER.

一般演題 . *Brugada* 症候群、早期再分極症候群に対する心内膜側、心外膜側の
カテーテル・アブレーションについて

1.

Step wise approach for Ablation of Ventricular Fibrillation in Brugada Syndrome: Evidence From Endocardial Mapping.

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INTRODUCTION

Despite effectiveness of both , endocardial catheter ablation(CA)of ventricular fibrillation (VF)-triggering premature ventricular contractions(PVCs)and substrate modification of the right ventricular outflow tract (RVOT) epicardium in Brugada syndrome(BrS),it is unclear which approach should be practiced first and which case responds to which approach.

OBJECTIVE

To identify what kind of BrS cases respond to endocardial trigger elimination and who requires more invasive epicardial substrate modification.

METHODS

Among 100 BrS patients presented with syncope/VF, CA was performed in 16 patients. Detailed endocardial mapping revealed heterogeneous electrophysiological substrate characteristics, namely; 56% of the cases did not exhibit endocardial late potentials (LP) or low voltage areas, 25 % exhibited non-fractionated LPs and 19%, who experienced more than 20 VF episodes, had fractionated LPs. CA of VF-trigger PVCs followed by additional consolidation radiofrequency applications around the PVC origin and LP sites was performed in the RVOT-free wall in 77% of the cases and in the RV itself in the rest of the cases. VF

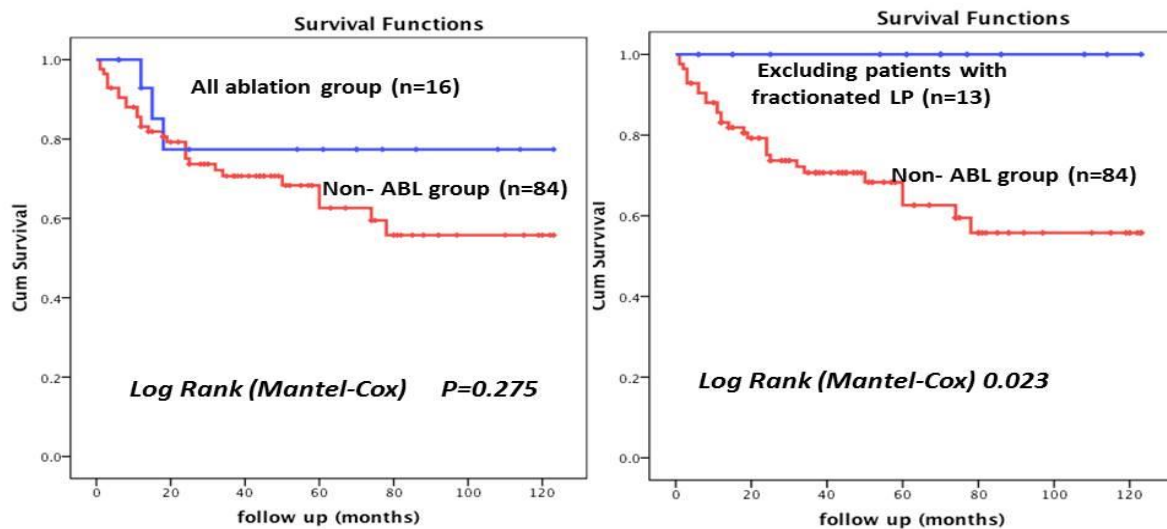
induction was performed in 7 patients, however; CA rendered VF non-inducible in all of the 7 patients with normalization of Brugada-type ECG in 2 patients.

RESULTS

During 54 ± 43 (6-123) months follow up, VF recurrence was observed in all patients with fractionated LPs (Figure) despite occurrence of triggering PVCs and normalization of Brugada pattern ECG in 2. Epicardial approach completely prevented VF recurrence in 2 patients and is planned for the third one.

CONCLUSION

Trigger elimination followed by substrate modification around the site of origin has excellent long-term outcome while presence of endocardial fractionated delayed potentials, in patient with the most frequent VF episodes, indicates inadequacy of endocardial ablation and epicardial approach is necessary.



2.

Epicardial Catheter Ablation for Brugada Syndrome in Nagoya University Hospital

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Ventricular fibrillation (VF) in patients with Brugada syndrome is life-threatening and repeated arrhythmia. Ablation for Brugada syndrome has been reported recently and the targets of ablation were the trigger ventricular premature beat and/or the epicardial substrate of the right ventricle (RV). We have performed epicardial catheter ablation in 6 Brugada syndrome patients (all men, 19 to 67 years old). All patients had history of aborted sudden cardiac death and ICD implantation. 5 patients had frequent ICD shocks because of VF before the ablation. Epicardial and endocardial electroanatomical mapping of RV was performed in every patients. None of the patients had abnormal eletrogram in RV endocardium. All patients had abnormal electrograms in RV epicardium and most of them were recorded at anterior aspect of RV outflow tract. Substrate ablation targeting those abnormal electrograms were performed (mean RF time 41.1 ± 11.5 minutes). There were no major complications associated with the ablation procedure. After ablation, Brugada ECG patterns disappeared in 5 patients and VF was not inducible in those patients. All 6 patients were free from VF after ablation (follow up period range of 4 to 38 months). We concluded that the epicardial RV ablation were effective at preventing VF for the patients with Brugada syndrome for a short period. We need further investigations to confirm the long term effects of epicardial ablation in the patients with Brugada syndrome.

3.

A Case of Catastrophic Brugada Syndrome with Electrical Storm Suppressed by Anterior Right Ventricular Epicardial Ablation

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Aim: To identify clinical substrate by advanced signal analysis in Brugada syndrome (BrS) patient.

Method: Electroanatomical mapping (CARTO3) of right ventricle (RV), with endocardial and epicardial procedures was performed for a 33-year-old man with 6 ICD shocks.

Results: Hilbert Huang Transform (HHT) analysis revealed abnormal signals with high frequency fractionation in anterior RV epicardium. Ablation at these sites rendered VT/VF non-inducible.

Conclusions: Quantification of LAVA by using HHT analysis was feasible and more predictable for determining target ablation sites compared to visual potential mapping in BrS patient.

4.

First Case of Epicardial Ablation to Coexistent J Waves in the Inferior Leads in a Patient with Clinical Diagnosis of Brugada Syndrome

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We describe unique mapping and ablation results from a 38 year-old man with a fixed type-1 Brugada ECG pattern with clinical diagnosis of BrS because recurrent VF episodes and multiple appropriate shocks from his implantable cardioverter defibrillator. Extensive investigations including echocardiography, cardiac magnetic resonance imaging (MRI) and an endocardial bipolar voltage map were essentially normal. However, an endocardial unipolar voltage map detected an abnormal low voltage area in the perivalvular RV, and furthermore, a detailed epicardial bipolar voltage map identified abnormal low voltage areas with highly fractionated electrograms located in the anterior RVOT and inferior RV epicardially. Epicardial ablations were performed with the goal of eliminating abnormal electrograms. The ablation power setting was 20-25 watts, with a temperature limit at 41°C using an open irrigated ablation catheter, for a duration of 20-30 seconds at each target site. The amplitude of the negative T waves recorded in leads V1 and V2 were attenuated following epicardial ablations targeting the anterior RVOT scar. Furthermore, the J wave amplitudes were noticeably smaller in leads II and aVF, while S waves became more prominent following additional epicardial ablations targeting the inferior aspect of the RV. The patient has been free from any VF recurrence at 30-month clinic follow-up. To the best of our knowledge, this represent the first case report illustrating extensive epicardial bipolar voltage abnormality in patient with clinical diagnosis of BrS and coexistent J waves which was modified by ablation and good medium term ablation outcome.