High-Density mapping is useful to identify the circuit of ventricular tachycardia: A case report of the experience of using HD-Grid Catheter.

Yui Nakayama
Hisao Matsuda
Akira Kasagawa
Kasahara Mizuho
Marika Yamada
Kazuaki Okuyama
Norio Suzuki
Kei Mizukoshi
Makoto Takano
Ikutaro Nakajima
Toshiyuki Furukawa
Hidekazu Miyazaki
Keiichi Mizuno
Harada Tomoo
Yoshihiro Akashi

Introduction: Advances in 3D mapping systems have made it possible to visualize high density (HD) intracardiac potentials, which help identify the circuit of arrhythmias. We report a case in which a 3D mapping system was useful to identify the reentrant circuit of ventricular tachycardia (VT) in a patient with cardiac sarcoidosis.

Methods: A 59 years old female with cardiac sarcoidosis who had been implanted a pacemaker for complete atrioventricular block was hospitalized because of severe nausea. The electrocardiogram revealed wide QRS regular tachycardia with 200 bpm. Echocardiography showed high degree of thinning of ventricular septum and the ejection fraction was reduced to 34%. Because her hemodynamic status was unstable, cardioversion was performed and the tachycardia was terminated. Although continuous intravenous administration of Amiodarone was performed, the tachycardia was recurred. She underwent an emergent Electrophysiological Study for further evaluation of the wide QRS tachycardia. The wide QRS tachycardia was diagnosed as VT with confirmation of atrioventricular dissociation. The morphology of QRS was right bundle branch block type with upper axis, the width of QRS was 129ms, and the transitional zone was observed in V1 lead. Tachycardia cycle length (TCL) was 412ms. Because her hemodynamic status was stable, the mapping was performed during VT.

Result: An electro anatomical mapping system (EnSite Velocity; Abbott) was introduced and the HD mapping was obtained by HD Grid Mapping Catheter (Abbott). An HD Grid catheter was inserted into the left ventricle (LV) with retrograde approach. The voltage map of the LV revealed wide low voltage area at the base of LV, where is consistent with the findings of echocardiography. Mid diastolic potential was recorded at the base of the LV septum, entrainment pacing at this site revealed slight fused QRS configuration and the stimulus QRS time (S-QRS) was 44ms and postspacing interval (PPI) was 435ms which was judged as an outer loop of VT circuit. An ablation catheter (FlexAbility; Abbott) was located at the same site and radiofrequency catheter ablation (RF) was performed. Although TCL was prolonged to 556ms, VT was not terminated. The ablation catheter was advanced toward apical slightly, the spiky
pre potential was recorded at the tip of the ablation catheter and the unipolar electrogram was QS pattern. Entrainment pacing at this site revealed concealed entrainment and S-QRS was 56ms. This site was diagnosed as the Exit of the VT circuit, and the RF application at this site could terminate the VT within 2 seconds. After the RF, VT could not be induced with any ventricular stimulation.

**Conclusion:** HD mapping was useful to identify the VT circuit. We report a case of VT arising from LV in a patient with cardiac sarcoidosis which was successfully ablated using HD mapping with some considerations.