QRS Morphologies and Mechanisms of Bidirectional Ventricular Tachycardia in Four Patients

Takeshi Kitamura1, Seiji Fukamizu1, Noriko Matsushita1, Rintaro Hojo1, Tomoko Abe1, Takekuni Hayashi1, Kota Komiyama1, Yasuhiro Tanabe1, Tamotsu Tejima1, Harumizu Sakurada1, Mitsuhiro Nishizaki2, Masayasu Hiraoka3

1Department of Cardiology, Tokyo Metropolitan Hiroo Hospital, Tokyo, Japan, 2Department of Cardiology, Yokohama Minami Kyosai Hospital, Yokohama, 3Tokyo Medical and Dental University, Tokyo

Bidirectional ventricular tachycardia (BVT) is a rare but intriguing arrhythmia. We report the cases of 4 patients with BVT. Patient 1 was a 15-year-old girl with catecholaminergic polymorphic ventricular tachycardia (CPVT). Patient 2 was a 37-year-old female with CPVT. These 2 cases showed a RBBB configuration with right axis deviation and left axis deviation. Patient 3 was a 43-year-old male with aconitine (Torikabuto) intoxication who showed BVT with various QRS morphologies. Patient 4 was a 54-year-old female who showed a LBBB configuration thought to have arrhythmogenic right ventricular cardiomyopathy. All of them survived after cardiopulmonary arrest. The mechanism of BVT in patient 4 was considered to be macro-reentry; an electrophysiological study showed a common reentrant circuit and 2 different exits. In 2 patients with CPVT, delayed afterdepolarizations were considered to induce BVT because of pharmacological suppression by verapamil, propranolol, and adenosine triphosphate. Some reports suggested triggered activity mediate fatal ventricular arrhythmias, including BVT induced by aconitine intoxication. However, the mechanism in patient 3 was pharmacologically unidentified.

Conclusion: The mechanisms of BVT are considered to be triggered activity and reentry. The morphology of BVT may be helpful for diagnosis of underlying heart disease.

Keywords: bidirectional VT, CPVT, aconitine