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The radiofrequency catheter ablation of inter-fascicular reentrant tachycardia -new insights into the electrophysiological and anatomical characteristics

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Introduction: Macro-reentrant ventricular tachycardias (VT) utilizing the bundle branches and Purkinje fibers have been reported as verapamil sensitive VT (idiopathic left VT), bundle branch reentrant VT (BBRT) and inter-fascicular reentrant tachycardia (inter-fascicular VT). However, diagnostic confusion exists with these VTs due to the difficulty in differentiating between them with conventional EP studies. The aim of this study was to clarify the electrophysiological (EP) and anatomical entity of inter-fascicular VT and provide successful methods for the radiofrequency catheter ablation (RFCA) of inter-fascicular VT.

Methods and Results: A total of nine patients were included in this study. All patients were diagnosed with idiopathic left VT in the first session and underwent a second session after a failed RFCA. Detailed EP studies guided by a three-dimensional mapping system (3D) were performed to further analyze the VTs. All VTs were finally diagnosed as inter-fascicular VT. They were successfully cured with RFCA targeting the left anterior or posterior fascicle, which was regarded as a requisite part of the reentrant circuit of the inter-fascicular VT, using 3D and fluoroscopic images combined with a detailed EP investigation instead of the conventional RFCA method targeting Purkinje potentials for the RFCA of idiopathic left VT.

Conclusions: Inter-fascicular VT could be misdiagnosed as idiopathic left VT due to the limitations of the conventional EP study. Failed RFCA in presumptive idiopathic left VT cases has to be carefully investigated by further analysis, and a tailored RFCA strategy targeting the requisite portions of the left fascicles in the inter-fascicular VT reentrant circuit will be required for the successful elimination of the inter-fascicular VT.

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