Phase 2 reentry in man - DTU Orbit (11/12/2018)

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**BACKGROUND** Ventricular extrasystoles are characterized by a fixed coupling interval to the last QRST complex preceding it. **OBJECTIVES** We hypothesized that this QRST complex differed from QRST complexes of other sinus beats not followed by ventricular extrasystoles. Further, we investigated whether phase 2 reentry, demonstrated in animal experiments to initiate ventricular extrasystoles, ventricular tachycardia, and ventricular fibrillation, also plays a role in humans. **METHODS** We examined 18 patients with ventricular extrasystoles and/or ventricular tachycardia by signal averaging of the ECG (group A) or by single-beat analysis of intracardiac electrograms (group 13). Group A consisted of six patients without structural heart disease and one patient with the Brugada syndrome. Six of the seven patients had right ventricular outflow tract ventricular extrasystoles. Group B consisted of 11 patients undergoing radiofrequency ablation. Eight of the 11 patients had right ventricular outflow tract extrasystoles. **RESULTS** In six of the seven patients in group A, we demonstrated significant ST-elevation and/or T-wave changes in the sinus beat preceding ventricular extrasystoles compared with the second last sinus beat in one or more of the three orthogonal leads X, Y, and Z. In 9 of the 11 patients in group B, single-beat analysis of unipolar and bipolar electrograms recorded close to successful ablation sites demonstrated similar changes, that is, ST-elevation (median peak voltage gradient 150 μV, range 0-1,700) and T-wave changes in the sinus beat prior to ventricular ectopy. In addition, J-point elevation was demonstrated in several cases. In total, significant changes were demonstrated in 15 of the 18 patients studied (83%). **CONCLUSION** J-point elevation, ST-elevation, and T-wave changes documented in the last sinus beat prior to ventricular extrasystoles are in agreement with phase 2 reentry, suggesting that this may be the responsible mechanism for ventricular extrasystoles and ventricular tachycardia/fibrillation. The phenomenon has been demonstrated in only animal experiments to date.