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Objective It has been reported that Adrenergic beta stimulation attenuated ST-elevation and ventricular arrhythmia and electrical storm was suppressed by treatment with low-dose isoproterenol (Iso) in some cases of Brugada syndrome. However, there have been few systematic studies on ionic mechanisms of the effects of isoproterenol.

Methods Single epicardial myocytes of right ventricle of the rabbits were isolated with enzymatic dissociation. The whole-cell patch clamp recording technique was used to observe the effect of 1μM Iso on action potential duration APD), type calcium current (Ica, L) and transient outward potassium current (Ito) in epicardial myocytes of right ventricle of the rabbits.

Results (1) Iso significantly prolonged APD_{20}, D_{50} and APD_{90} from (151.3±11.8)ms, 68.7±27.3) ms and (380.9±34.6) ms to (195.4±13.3) ms, (324.5±32.8) ms and (423.5±42.1) ms (n=14, $p<0.05$), respectively. (2) At +60 mV, Ito decreased from (11.4±1.7) pA/pF to (6.3±0.5) pA/pF (n=16, $p<0.05$) after 1 μM Iso. 1 μM Iso downshifted the I-V curves of Ito without changes of their active, peak and reverse potentials; 1 μM Iso turned the steady-state inactivation curve to left and the curve of time recovery from inactivation of Ito moved right. $V_{1/2,act}$ and k_{act} of Ito had no significant difference before and after 1 μM Iso. (3) 1 μM Iso increased peak $I_{Ca,L}$ from (−6.1±0.6) pA/pF to (−8.6±0.9) pA/pF (n=10, $p<0.05$), respectively. 1 μM Iso downshifted the I-V curves of ICa without changes of their active, peak and reverse potentials.

Conclusions Iso could prolong APD, especially APD_{20} and APD_{50}; Iso blocked Ito in a voltage dependent manner and probably inhibited Ito in its inactive state; Iso augmented $I_{Ca,L}$ in a voltage dependent manner, which could be an important mechanism to suppress ventricular arrhythmia and electrical storm of Brugada syndrome.

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STUDIES ON IONIC MECHANISMS OF THE EFFECTS OF ISOPROTERENOL ON BRUGADA SYNDROME

Huang Zhengrong, Li Weihua, Xie Qiang *Department of Cardiology, The First Affiliated Hospital of Xiamen University, Xiamen, China*