Effect of 17b-estradiol on tachycardia-induced changes of atrial refractoriness and cisapride-induced ventricular arrhythmia

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摘要

Abstract

INTRODUCTION: Gender difference is known to be associated with the occurrence of arrhythmia. However, the effects of female sex hormone on atrial electrophysiology, and on the occurrence of torsades de pointes (TdP) induced by cisapride have been unclear. METHODS AND RESULTS: Two experiments were included in this study. In experiment 1, effective refractory periods (ERPs) from five epicardial atrial sites were measured before and after rapid atrial pacing at 800 beats/min for 30 minutes in dogs with pretreatment of verapamil (n = 10), 17beta-estradiol (n = 10), or without pretreatment (n = 10, control group). In experiment 2, limb-lead ECG and monophasic action potentials in the left and right ventricles were recorded before and after each dose of cisapride (2 to 6 mg/kg) during different ventricular rates in dogs with (n = 9) and without (n = 14) concomitant administration of 17beta-estradiol (0.3 microg/kg). After 17beta-estradiol administration, there were greater atrial ERPs in the study dogs than in the control group. The atrial ERPs were shortened significantly after rapid atrial pacing, but the degree was greater in the control group than in the dogs pretreated with verapamil or 17beta-estradiol. Moreover, the recovery of atrial ERPs was faster in dogs pretreated with verapamil or 17beta-estradiol than in the control group. In experiment 2, cisapride prolonged the QT interval and biventricular APD90 and induced early afterdepolarizations (EADs) in a dose-dependent manner. However, dogs receiving cisapride combined with 17beta-estradiol had a

greater increase of ventricular repolarization and a higher incidence of EADs than those receiving cisapride only. Moreover, dogs receiving cisapride combined with 17beta-estradiol (3/9, 33%) had a greater incidence of TdP than those receiving cisapride only (0/14, 0%, $P < 0.05$). CONCLUSIONS: 17beta-estradiol has a significant effect on atrial electrophysiology, which may be related to the prevention of atrial fibrillation. However, the high incidence of TdP in dogs receiving cisapride combined with 17beta-estradiol suggests that the female sex hormone is an important risk factor of cisapride-induced proarrhythmia