

HYPERTONICITY INCREASES RABBIT ATRIUM AND PULMONARY VEIN ARRHYTHMOGENESIS: A POTENTIAL CONTRIBUTOR TO THE GENESIS OF ATRIAL FIBRILLATION.

陳亦仁

Lee SH;Chen YC;Cheng CC;Higa SH;Chen YJ;Chen SA

摘要

Abstract

1. Pulmonary veins are the most important focus for the initiation of atrial fibrillation. Diabetes mellitus may be associated with hypertonicity and increased occurrence of atrial fibrillation. 2. The purpose of the present study was to investigate whether hypertonicity alters the electrophysiological characteristics of pulmonary veins and atria to enhance the genesis of atrial fibrillation. 3. A whole-cell patch-clamp technique was used to investigate action potentials and ionic currents in rabbit isolated single pulmonary vein and atrial cardiomyocytes during immersion in isotonic and hypertonic (1.2x normal osmolality) solutions. 4. Hypertonicity increased the spontaneous beating rates of pulmonary vein cardiomyocytes from 2.3 ± 0.3 to 3.4 ± 0.3 Hz ($n = 11$; $P < 0.001$). Hypertonicity prolonged action potential duration to a greater extent in atrial cardiomyocytes than in pulmonary vein cardiomyocytes. Compared with atrial cardiomyocytes, hypertonicity increased the transient inward currents and $\text{Na}^+/\text{Ca}^{2+}$ exchange currents to a greater extent in pulmonary vein cardiomyocytes, but decreased the delayed rectified potassium currents to a lesser extent. 5. Hypertonicity plays an important role in the electrical activity of pulmonary vein and atrial cardiomyocytes, which may have a potential role in the pathophysiology of atrial fibrillation.