Acute Amiodarone Slows Down the Spiral Rotation and Prevents the Wave-Break During Ventricular Tachycardia

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[Aim] Intravenous amiodarone (AM) is effective for prevention of ventricular fibrillation (VF) in patients with cardiopulmonary arrest, but the underlying mechanism is unknown. We investigated acute effects of AM on the spiral dynamics during ventricular tachycardia (VT) in rabbit hearts perfused in vitro. **[Methods]** 2D subepicardial myocardial layers (~1mm thick) were prepared by cryoablation of the left ventricular cavity. Action potential signals were recorded and analyzed by high-resolution video imaging. **[Results]** Under basic stimuli (2.5 Hz), AM (3μM) caused significant decreases in the conduction velocity by 7.7±2.9% along and 14.0±2.1% across the fiber orientation (n=5, $P<0.05$) without affecting action potential duration. During VT elicited by cross-field stimulation, spiral-type reentry rotating around a functional block line (FBL) was visualized. In controls, the distance between wave-front and wave-tail (excitable gap) was minimal, often resulting in complex break-up of wave fronts. In the presence of AM, VT cycle length was prolonged by 19.3±3.3% (n=5, $P<0.05$). Diastric interval during VT was also prolonged (by 48.8±14.4%, n=5, $P<0.05$), reflected in a large spatial excitable gap without break-up of wave-fronts. **[Conclusion/discussion]** Acute AM slows down the spiral rotation and prevents wave-break through a reduction of myocardial excitability and a widening of the excitable gap. These effects would prevent a transition from VT to VF.

Effects of Lowering Barometric Pressure and Ambient Temperature on Blood Pressure, Heart Rate and Pulse Interval Variability in Conscious Rats

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[Aim] To examine the effects of change in meteorological factors on autonomic parameters in conscious animal, male Sprague-Dawley rats (n = 6) were exposed to low barometric pressure (LP: 27 hPa below the natural atmospheric pressure) and low ambient temperature (LT: 7°C lower than 22°C) in a climate-controlled room. **[Methods]** Systemic blood pressure (BP) of unrestrained rats was telemetrically recorded using a radio-transmitter equipped with a BP transducer during LP (45 min) and LT (65 min) exposures. Heart rate (HR) and pulse interval variability were analyzed by power spectrograms obtained by the fast-Fourier transform algorithm. The low-frequency (LF: 0.02–0.6 Hz) power, high-frequency (HF: 0.8–3.0 Hz) power and LF/HF ratio, an index of relative sympathetic activity, were measured. **[Results]** The BP increased in the middle of the LP-exposure period. The HR and LF/HF ratio clearly increased in the early part of the LP-exposure period and then gradually decreased to the level before exposure. The LF/HF ratio also transiently increased at the recompression period. In the LT exposure, the BP and HR gradually increased to peak in the late part of the exposure period, while LF/HF ratio increased throughout the exposure period. After LT exposure these values gradually returned to the level before exposure. **[Conclusion]** The LP and LT exposures increased the BP and HR of unstrained rats with different time courses. The increase in the LF/HF ratio during both LP and LT exposures indicates that both environments induce sympathetic > parasympathetic activation in conscious rats.