POTENTIAL ELECTROPHYSIOLOGICAL IMPACTS OF SUPRA-PHYSIOLOGICAL TESTOSTERONE LEVEL: INVESTIGATION OF THE EFFECTS OF TESTOSTERONE-UNDECANOATE ADMINISTRATION CHRONICALLY IN A LARGE ANIMAL MODEL

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Despite the legally stipulated availability of various androgen anabolic steroids (AAS), abuse of these products causes a major public health problem among young adults. Chronic use of AASs may result in structural and functional remodeling of the heart. The aim of our study was to investigate the potential electrophysiological effects of chronic administration of testosterone-undecanoate in a large animal model in *in vivo* and *in vitro* studies.
Eight male beagle dogs were randomized into control (’Cont’) and treated (’Tr’) groups (n = 4; n = 4). The latter group received 15 mg/kg testosterone-undecanoate weekly for 3 months. Blood samples were taken for monitoring testosterone levels. ECG and ECHO procedures were performed. Ventricular myocytes were enzymatically dissociated via retrograde perfusion. The transmembrane ionic currents were recorded using the whole-cell configuration of the patch-clamp technique and the action potential duration (APD) was measured by the perforated patch-clamp technique.
Testosterone level was significantly higher in the ‘Tr’ group compared to the ‘Cont’ group (47.02 nm/L vs. 15.23 nm/L; p = 0.0002). The APD of isolated left ventricular myocytes was seemingly shorter in the ‘Tr’ group. In terms of different potassium currents, the amplitude of the slow delayed rectifier potassium current was increased in the ’Tr’ group.
The repolarization of canine ventricular myocardium was significantly modified by constantly high doses of testosterone. Although the physiological level of testosterone provided many benefits to health, the supra-physiological level induced potential cellular and structural changes may lead to life-threatening arrhythmias under certain circumstances.

Keywords: testosterone, electrophysiology, patch-clamp, hypertrophy, fibrosis