Homogenous distribution of fast response action potentials in canine pulmonary vein sleeves: a contradictory report.

許準榕
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Abstract

Pulmonary veins may serve as source of ectopic focus (or foci) in initiating atrial tachyarrhythmias in human beings. However, the animal model for such focal atrial fibrillation is still lacking and cellular mechanism for arrhythmias remains to be studied. Recently, a series of reports of cellular electrophysiological characterization of pulmonary vein sleeves demonstrated an extremely high incidence of automaticity (varied from 40 to 76%) and triggered activity (from 0 to 44%) in normal healthy control dogs and rabbits. The present study was therefore designed to re-investigate the cellular electrophysiological properties of canine pulmonary veins. Intracellular action potentials were characterized in pulmonary vein sleeves in 50 normal healthy dogs. Conventional glass microelectrode recording technique was used. Experiments were focused on the incidence of automaticity and triggered activity in pulmonary vein sleeve tissues. Surprisingly, our results showed that all pulmonary vein sleeves tissues in these dogs displayed fast-response action potentials under the well-controlled experimental condition (100%, n=50). No spontaneous pacemaking activities, early or delayed afterdepolarisations were observed (0%, n=50). No high-frequency spikes or irregular rhythm could be recorded in all experiments (0%, n=50). Both the frequency response and membrane responsiveness of the pulmonary vein action potentials were characterized. No electrophysiological inhomogeneity between the distal and the proximal part of the sleeves was observed. In conclusion, canine pulmonary vein sleeves do not display arrhythmogenic activities under normal physiological conditions. The possible explanations for the controversy in pulmonary veins electrophysiology were discussed.