Cholinergic Stimulation Improves Oxidative Stress and Inflammation in Experimental Myocardial Infarction

Abstract
We previously reported that cholinergic stimulation with pyridostigmine (PY) induces anti-inflammatory cell recruitment soon after myocardial infarction (MI). In this study, we evaluated the anti-inflammatory effects of PY during the proliferative phase of cardiac repair by analyzing the infiltration of macrophages, Treg lymphocytes, oxidative stress and inflammatory cytokines. Wistar rats underwent control sham surgery or ligation of the left coronary artery and were randomly allocated to remain untreated (untreated infarcted group, I) or to receive PY (30 mg.kg(-1).day(-1)) in the supplied water (infarcted treated group, I + PY). Blood pressure and heart rate variability were registered at day 5 post-MI. The animals were euthanized 7 days after thoracotomy, when the hearts were removed and processed for immunohistochemistry (CD68, CD206, FOXP3), cytokines (IL-1 beta, IL-6, IL-10, TNF-alpha) and oxidative stress (superoxide dismutase, catalase, glutathione peroxidase, lipidic and protein peroxidation). PY treatment increased parasympathetic modulation, M2 macrophages and the antioxidant enzyme activity but reduced protein oxidation (carbonyls) and the concentration of IL-1 beta, IL-6, TNF-alpha and IL-10. Cholinergic stimulation induces parasympathetic neuro-immune modulation and anti-inflammatory cell enrollment as well as prevents oxidative stress and cytokine production after MI. (AU)