Cardiovascular & Hematological Disorders-Drug Targets

VOLUME 21, 2021

ISSN: 2212-4063 (Online) - ISSN: 1871-529X (Print)

Intra-arterial Instillation Of A Nociceptive Agent Modulates Cardiorespiratory Parameters Involving 5-HT3 And TRPV1 Receptors In Anesthetized Rats.

Authors:

Sanjeev K. Singh, M. S. Muthu, Ravindran Revand and M. B. Mandal

Affiliation:

Department of Physiology, Institute of Medical Sciences, Banaras Hindu University,Varanasi, UP

Abstract:

Background: Since long back, it has been a matter of discussion regarding the role of peripheral blood vessels in the regulation of cardiorespiratory (CVR) system.

Objective: The role of 5-HT3 and TRPV1 receptors present on perivascular nerves in elicitation of CVR reflexes was examined after intra-arterial instillation of bradykinin in urethane anesthetized rats.

Materials and Methods: Femoral artery was cannulated retrogradely and was utilized for the instillation of saline/agonist/antagonist and recording of blood pressure (BP), using a double ported 24G cannula. BP, respiration and ECG were recorded for 30 min after bradykinin (1 µM) in the absence or presence of antagonists.

Results: Instillation of bradykinin produced immediate hypotensive (40%), bradycardiac (17%), tachypnoeic (45%) and hyperventilatory (96%) responses of shorter latencies (5-8 s) favoring the neural mechanisms in producing the responses. In lignocaine (2%) pretreated animals, bradykinin-induced hypotensive (10%), bradycardiac (1.7%), tachypnoeic (13%) and hyperventilatory (13%) responses attenuated significantly. Pretreatment with ondansetron (100 µg/kg), 5-HT3-antagonist attenuated the hypotensive (10%), bradycardiac (1.7%), tachypnoeic (11%) and hyperventilatory (11%) responses significantly. Pretreatment with capsazepine (1 mg/kg), transient receptor potential vanilloid 1- antagonist blocked the hypotensive (5%), bradycardiac (1.2%), tachypnoeic (6%) and hyperventilatory (6%) responses significantly.

Conclusion: In conclusion, presence of a nociceptive agent in the local segment of an artery evokes vasosensory reflex responses modulating CVR parameters involving TRPV1 and 5-HT3 receptors present on the perivascular sensory nerve terminals in anesthetized rats.