

Injection of Bradykinin in Femoral Artery Elicits Cardiorespiratory Reflexes Involving Perivascular Afferents in Rat Models

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Abstract : The physiology of baroreceptors and chemoreceptors present in large blood vessels of the heart is well known in regulation of cardiorespiratory functions. Since large blood vessels and peripheral blood vessels are of same mesodermal origin, therefore, involvement of the latter in regulation of cardiorespiratory system is expected. Role of perivascular nerves in mediating cardiorespiratory alterations produced after intra-arterial injection of a nociceptive agent (bradykinin) was examined in urethane anesthetized male rats. Respiratory frequency, blood pressure, and heart rate were recorded for 30 min after the retrograde injection of bradykinin/saline in the femoral artery. In addition, paw edema was determined and water content was expressed as percentage of wet weight. Injection of bradykinin produced immediate tachypnoeic, hypotensive and bradycardiac responses of shorter latency (5-8 s) favoring the neural mechanisms involved in it. Injection of equi-volume of saline did not produce any responses and served as time matched control. Paw edema was observed in the ipsilateral hind limb. Pretreatment with diclofenac sodium significantly attenuated the bradykinin-induced responses and also blocked the paw edema. Ipsilateral femoral and sciatic nerve sectioning attenuated bradykinin-induced responses significantly indicating the origin of responses from the local vascular bed. Administration of bradykinin in the segment of an artery produced reflex cardiorespiratory changes by stimulating the perivascular nociceptors involving prostaglandins. This is a novel study exhibiting the role of peripheral blood vessels in regulation of cardiorespiratory system.

Keywords : vasosensory reflex, cardiorespiratory changes, nociceptive agent, bradykinin, VR1 receptors

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