

基础研究

C型钠尿肽对家兔心房机械活动的影响及其作用机制

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摘要:

目的: 观察C型钠尿肽(CNP)对心房机械活动和心房肌细胞内环核苷酸浓度的影响,并探讨其作用机制。方法: 大耳白兔麻醉后立即开胸取出心脏置于氧饱和的36.5℃生理盐水中,剥离左心房后立即固定在心房灌流装置上,以不同浓度CNP(10、30和300 nmol·L⁻¹)处理各1个循环后,实时测定心房搏出量和心房搏动压。采用放射免疫法测定30 nmol·L⁻¹CNP处理的cAMP和cGMP含量。结果: ①与对照循环组比较,不同浓度的CNP(10、30和300 nmol·L⁻¹)组家兔心房搏出量和心房搏动压均明显降低(P<0.05或P<0.01);CNP浓度越高心房搏出量和心房搏动压越低;其中300 nmol·L⁻¹ CNP组心房搏出量和心房搏动压降低率分别达74.8%和76.9%。②与对照循环组比较,30 nmol·L⁻¹CNP组心房搏出量和心房搏动压均明显降低(P<0.01);cGMP含量明显增多,约增加10.2倍(P<0.01),cAMP含量则无明显变化(P>0.05)。结论: CNP抑制家兔心房机械活动,其机制与增加细胞内cGMP含量有关,即经CNP-GC-cGMP信号转导途径调节心房机械活动。

关键词: C型钠尿肽; 心房功能; 环核苷酸

Effect of C-type natriuretic peptide on atrial dynamics in beating rabbit atria and mechanism of action

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Abstract:

Abstract: Objective

To examine the effects of C-type natriuretic peptide (CNP) on the atrial dynamics and cyclic nucleotides level in the atrial myocytes in rabbits and explore its mechanism of action. Methods Atria were obtained from New Zealand white rabbits, and the experiments were performed using a perfused beating atrial model. Briefly, the heart was removed from rabbit which had been anesthetized and the left atria was dissected free, and then it was fixed in perfused beating atrial model. The effects of CNP (10, 30, or 300 nmol·L⁻¹) on atrial pulse pressure and atrial stroke volume were analyzed, and cAMP efflux and cGMP levels which were dealt with 30 nmol·L⁻¹ CNP were measured by radioimmunoassay. Results ①CNP (10, 30, and 300 nmol·L⁻¹) significantly decreased the atrial pulse pressure and atrial stroke volume in perfused beating atria compared with control group (P<0.05 or P<0.01); these effects showed dose-dependent manner, and the maximum inhibitory rates in 300 nmol·L⁻¹ CNP group were 74.8% and 76.9%, respectively. ② 30 nmol·L⁻¹ CNP significantly decreased the atrial pulse pressure and atrial stroke volume in perfused beating atria compared with control group (P<0.01), and the cGMP level in the atrial myocytes was significantly increased, about 10.2 times, compared with control group (P<0.01), but the cAMP level didn't change (P>0.05). Conclusion CNP can inhibit the atrial dynamics, its mechanism may be related to the increasing of cGMP level through CNP-GC-cGMP signal pathway in rabbit atria.

Keywords: C-type natriuretic peptide atrial function cyclic nucleotide

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