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Effects of activity of lipid peroxide and superoxidation dismutase on membrane fluidity of erythrocyte in patients with chronic cor pulmonale

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Abstract Objective: To explore the effects of the activity of lipid peroxide and superoxidation dismutase on membrane fluidity of erythrocyte in patients with chronic cor pulmonale. Methods: The membrane fluidity of erythrocyte and the activity of lipid peroxide (LPO) and superoxidation dismutase (SOD) were measured in 45 patients with chronic cor pulmonale (divided into two groups, i.e. CP-Ⅰ, CP-Ⅱ, according to patient's condition) and 22 healthy individuals. Results: The membrane fluorescence polarization degree of erythrocyte was significantly increased and the membrane fluidity of erythrocyte remarkably decreased ($P < 0.001$ and $P < 0.001$). In the plasma of the patients, the activity of LPO was significantly increased ($P < 0.05$) while that of SOD markedly decreased ($P < 0.05$). Linear regression analysis showed that fluorescence polarization degree of the erythrocyte membrane was positively correlated with LPO ($r = 0.4196$, $P < 0.05$) but negatively correlated with SOD ($r = -0.4283$, $P < 0.05$) in these patients. Conclusion: The membrane fluidity of erythrocyte is decreased in patients with chronic cor pulmonale. The increase of LPO activity and decrease of SOD activity are one of the important factors affecting membrane fluidity of erythrocyte.

Key words cor pulmonale; erythrocyte; membrane fluidity; lipid peroxide; superoxidation dismutase

钙增敏剂 MCI-154拮抗内毒素休克作用及机理的实验研究

An expeimental study on the therapeutical effects of MCI-154, a calcium sensitizer, on endotoxic shock and its mechanisms

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脓毒症、感染性休克过程中发生的心肌细胞内钙超载以及心肌收缩蛋白对钙敏感性降低,是脓毒症、感染性休克时心功能障碍的重要原因。目前临床上应用的正性肌力药物均是通过增加心肌细胞内钙浓度而达强心目的,因而都有增加心肌细胞内钙超载,加重心肌损害的可能性,且这些药物对因收缩蛋白对钙的敏感性降低所致心功能障碍疗效欠佳。因此,这些正性肌力药物在脓毒症、感染性休克中的应用受到了限制。钙增敏剂 MCI-154是近年来发现的一种新型的强心药物,它主要通过

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Effects of carbon dioxide pneumoperitoneum on cerebral oxygen saturation in patients with laparoscopic operation under different anesthesia

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Abstract Objective: In order to demonstrate the effects of carbon dioxide pneumoperitoneum on cerebral blood flow, the changes of cerebral oxygen saturation in patients with laparoscopic cholecystectomy (LC) was observed under different anesthesia. Methods: Thirty patients under laparoscopic cholecystectomy were randomly divided into general anesthesia group and epidural anesthesia group and rsO_2, SpO_2 and $PaCO_2$ were measured. Results: rsO_2 and $PaCO_2$ were increased singnificantly ($P < 0.05$ or $P < 0.01$) at 20 min after pneumoperitoneum in two groups. The correlations between $PaCO_2$ and rsO_2 were significant in two groups. At 30 min after operation, $PaCO_2$ level was recovered in general anesthesia group and it still kept high in epidural anesthesia group. But the changes of rsO_2 were not singnificant as compared with pre-pneumoperitoneum in two groups. Conclusion: Epidural anesthesian can be used selectively during LC.

Key Words carbon dioxide pneumoperitoneum; cerebral oxygen saturation

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增加心肌收缩蛋白对钙的敏感性,增加肌钙蛋白 C对钙的亲和力而增强心功能,其强心作用不伴心肌细胞内钙浓度的进一步升高。但 MCI-154对脓毒症(感染性休克心功能障碍的作用效果如何尚未见报道。为此,本实验利用家兔和大鼠内毒素休克模型,研究了 MCI-154拮抗内毒素休克的作用及其改善心功能的机理。主要结果及结论如下:

(1)家兔内毒素休克后 MAP、LVSP、IR±dp/dt_{max}、Vpm、V_{ce40}、Lo等血流动力学指标均显著低于假休克组,HR、LVEDP明显增加。MCI-154治疗后,内毒素休克家兔心功能明显增强,表现为 LVSP、±dp/dt_{max}、Vpm、V_{ce40}、Lo明显升高,LVEDP明显降低。MCI-154治疗后 0.5 h,MAP低于单纯 NS治疗组值,在整个实验期间 MAP上升幅度亦低于其它反映心脏作功的指标,同单纯 NS治疗组相比,MCI-154治疗后 LVEDP明显降低,且心率无明显升高。

(2)家兔内毒素休克后,肝、肾、肠系膜血流量明显降低;出现了代谢性酸中毒合并呼吸性碱中毒;血乳酸、LDH、β-G均明显升高。MCI-154治疗后,肝、肾、肠系膜血流量增加的幅度明显高于单纯 NS治疗组;血气、酸碱平衡紊乱的程度亦轻于单纯 NS治疗组;血乳酸、LDH、β-G上升的幅度明显低于单纯 NS治疗组;治疗后第 7天的动物存活率高于单纯 NS治疗组。

(3)内毒素休克大鼠离体乳头肌,在不同钙浓度的 H-K液中的等长收缩张力 T及张力的最大变化速率±dT/dt_{max}明显低于对照组,Ca^{2+}-T曲线及 Ca^{2+}±dT/dt_{max}曲线向下移位。加入 MCI-154后,内毒素休克大鼠离体乳头肌的 T及±dT/dt_{max}均明显增加,接近假休克组值;MCI-154的上述作用不被 α、β受体及钙通道阻断所抑制。

(4)内毒素休克大鼠裸露乳头肌和肌原纤维在 pCa(-log[Ca^{2+}])7.0-4.0浓度点上的相对张力及 ATP酶相对活性均明显低于正常对照组,张力-pCa曲线及 ATP酶-pCa曲线均向右下移位,两曲线的 pCa_{50}值明显低于正常对照组。MCI-154作用于内毒素休克大鼠裸露乳头肌后,乳头肌在各 pCa点上的张力及肌原纤维 ATP酶活性明显增大,接近正常对照组值,明显高于内毒素休克组及甲腈吡酮组值;张力-pCa曲线及 ATP酶-pCa曲线向左上移位,两曲线的 pCa_{50}值升高,达正常对照组水平;MCI-154增加内毒素休克大鼠裸露乳头肌钙激活张力的作用具有剂量依赖效应。

(5)钙增敏剂 MCI-154治疗内毒素休克后,心肌组织,肌浆网及线粒体的钙含量上升的幅度及心肌组织 cAMP增加的幅度明显低于甲腈吡酮治疗组;离体内毒素休克大鼠心肌细胞与 MCI-154一起孵育后,心肌胞浆内游离钙浓度无明增加;MCI-154对内毒素休克大鼠心肌肌膜 Na^+,K^+-ATP酶活性无明显的抑制作用。

上述结果表明 MCI-154能明显增强内毒素休克动物心功能,对心率无明显影响,同时还具有扩张外周血管的作用;应用于内毒素休克的治疗后,可增加器管及外周组织的灌流量,增加组织、细胞的供血供氧,对内毒素休克所引起的全身紊乱有一定的纠正作用。其强心机理主要与逆转内毒素休克后心肌对钙反应性的降低、增加心肌收缩蛋白对钙的敏感性有关;用于内毒素休克治疗后,不进一步加重心肌钙超载程度。

关键词　内毒素休克;心功能障碍;钙超载;正性肌力药物;钙增敏剂;MCI-154

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