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引用本文：黄黎华,陈渊成,程昱,何华,司倩,汤依群,柳晓泉.丹参水溶性成分含量变化对大鼠离体心肌能量代谢调节的影响[J].中国药科大学学报(中文版),2011,42(4):348-353

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中文摘要:通过离体心肌缺血/再灌注模型，考察丹参注射液各水溶性成分含量变化对大鼠离体心肌能量代谢调节的影响。大鼠随机分为模型对照组、丹参注射液组和4个成分外加组。大鼠离体心脏发生缺血/再灌注时给予相应药物，测定心肌组织中乙酰辅酶A(AcCoA)、辅酶A(CoA)、高能磷酸化合物及心肌缺血损伤标记物[乳酸(LD)、乳酸脱氢酶(LDH)和肌酸激酶(CK)]等药效指标。与对照组相比，外加原儿茶酸（PA）组显著降低AcCoA/CoA比值($P<0.05$)，显著升高总腺苷（TAN）和腺苷酸能荷（AEC）($P<0.05$)；外加丹酚酸B（SalB）组所造成的影响与外加PA类似，但对能量代谢指标的调节作用总体弱于PA。对实验数据建立反向传播神经网络模型，采用Garson算法计算4种水溶性成分对药效指标的贡献率。各成分对脂肪酸代谢类和高能磷酸化合物类指标的影响排序从大到小依次均为:PA、SalB、SalA、DSS；心肌缺血损伤标记物受各成分含量的影响顺序从大到小依次为:PA、SalB、DSS、SalA。结果提示，丹参注射液水溶性成分含量的改变能增加心肌ATP储备，升高腺苷酸能荷值，同时降低心肌组织中AcCoA/CoA比值，从而提高心肌能量代谢效率，这种作用尤以丹参注射液中酚酸类物质最为显著。

中文关键词:丹参注射液　心肌能量代谢　贡献率　离体心脏灌流

Effect of content variation of *Danshen* water-soluble components on myocardial energy metabolism in isolated ischemia-reperfusion rat hearts

Abstract: To investigate the effect of content variation of water-soluble components in *Danshen* injection on the myocardial energy metabolism in the isolated ischemia/reperfusion rat hearts.Rats were randomly divided into model groups,*Danshen* injection group and four component-adding groups.Drugs were administered when myocardial ischemia/reperfusion injury occurred,and the pharmacodynamics indices such as acetyl coenzyme A(AcCoA),coenzyme A(CoA),adenine nucleotides (AMP,ADP and ATP) and myocardial ischemia markers (lactate (LD),lactate dehydrogenase(LDH) and creatine kinase(CK)) were determined.Compared with the control group,the AcCoA/CoA ratio decreased significantly after adding protocatechuic acid (PA) ($P<0.05$),while the total adenosine (TAN) and adenylate energy charge (AEC) increased obviously ($P<0.05$).The effect of adding salvianolic acid B (SalB) was similar to PA,but the regulatory effect on the energy metabolism was weaker in total.A back-propagation neural network model was developed using experimental data,and the contribution of the four water-soluble components'contents to the pharmacodynamic indices were evaluated according to Garson algorithm.The effect of various components on the fatty acids and high-energy phosphate compounds ranked as PA>SalB>SalA>DSS;and the impact of components on the myocardial ischemia markers could be put in the following order:PA>SalB>DSS>SalA.The results suggest that water-soluble components of *Danshen* injection could save myocardial ATP and increase AEC,meanwhile,the AcCoA/CoA ratio in the tissue was reduced,thereby improving the efficiency of myocardial energy metabolism,during which the phenolic acids showed significant effects.

keywords: *Danshen* injection myocardial energy metabolism contribution value isolated heart perfusion

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