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丹参、红花水溶性组分及配伍对大鼠心肌缺血/再灌注损伤作用的实验研究

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中文摘要：目的: 将丹参、红花实现高效及高通量的组分分离与表征,观察其水溶性有效组分及其配伍对大鼠心肌缺血/再灌注(I/R)损伤的影响。 方法 :采用结扎SD大鼠冠状动脉(A)左前降支造成心肌缺血40 min后,剪开丝线,再灌注120 min,建立实验性心肌I/R损伤模型。结扎冠A 10 min后股静脉给药。实验分为假手术组(只穿刺不结扎),模型组,丹红注射液组(原儿茶醛质量浓度0.05 g·L^{-1},给药量1.80 g·kg^{-1}),丹参水溶性有效组分组(丹酚酸B质量浓度49 g·L^{-1},给药量30.68 g·kg^{-1}),红花水溶性有效组分组(羟基红花黄色素A质量浓度31.76 g·L^{-1},给药量17.87 g·kg^{-1}),丹参红花水溶性有效组分配伍组(给药量24.28,48.55 g·kg^{-1}),药物均用生理盐水稀释同等药量。假手术组和模型组注射等量生理盐水。每组10只。测定大鼠梗死(MI)面积大小,检测血清肌钙蛋白T(cTnT)水平,肌酸激酶同工酶(CK-MB)活性的变化,观察药物对心肌损伤后血浆血栓素(TXB_2)、6-酮-前列腺素$F_{1\alpha}$(6-keto-$PGF_{1\alpha}$)含量和血小板最大聚集率的影响。 结果 :造模后大鼠血清cTnT和CK-MB水平均有升高,和假手术组比较有显著差异(P<0.01)。与模型组比较,丹参、红花水溶性组分及其配伍低、高剂量组均能减少大鼠MI面积,降低血清CK-MB活性和cTnT水平。丹参水溶性组分能显著升高6-keto-$PGF_{1\alpha}$含量(P<0.01)和降低TXB_2含量(P<0.01),并对血小板聚集性有显著抑制作用(P<0.01)。红花水溶性组分对TXB_2水平降低幅度最大(P<0.01),丹参红花组分配伍后作用加强,部分指标改善幅度优于丹红注射液。 结论 :丹参、红花水溶性组分对I/R损伤后的指标改善方面侧重面有所不同,配伍后在降低MI面积,抑制CK-MB漏出和升高6-keto-$PGF_{1\alpha}$水平方面作用加强,从而抑制血小板聚集,防治血栓形成,对缺血后再灌注损伤的心肌有保护作用。

中文关键词：心肌缺血 缺血再灌注损伤 丹参酚酸B 羟基红花黄色素A 血小板聚集

Effects of *Salvia miltiorrhiza* and *Carthamus tinctorius* aqueous extracts and compatibility on rat myocardial ischemic reperfusion injury

Abstract: Objective : To separate and characterize aqueous extracts of *Salvia miltiorrhiza* and *Carthamus tinctorius* to efficient, high-throughput and strong polar components, to observe effects of their aqueous effective components compatibility on rat myocardial ischemic reperfusion injury. Method : Myocardial ischemic reperfusion injury model were established on SD rats by 40 min ligation of the left anterior descending artery and 120 min reperfusion. The rats were injected experimental drugs intravenously from femoral vein after 10 min ischemia. Rats were randomly divided into sham group(the suture around the left anterior descending coronary artery was not tied), model group, Danhong injection group (content of protocatechualdehyde is 0.05 g·L^{-1}, injection dosage equivalent to 1.80 g·kg^{-1}), aqueous effective component of *S. miltiorrhiza* group (content of salvianolic acid B is 49 g·L^{-1}, injection dosage equivalent to 30.68 g·kg^{-1}), aqueous effective component of *S. miltiorrhiza* group (content of hydroxysafflor yellow A is 31.76 g·L^{-1}, injection dosage equivalent to 17.87 g·kg^{-1}), aqueous effective components compatibility of *S. miltiorrhizae* and *C. tinctorius* group (injection dosage is respectively 24.28 g·$kg^{-1}$and 48.55 g·kg^{-1}), each group have ten rats. Drugs were diluted with an equal dose of normal saline.The rats of sham group and model group were injected equivalent dosage of saline.The myocardial infarction size and the contents of serum cTnT and CK-MB were detected. The level of TXB_2, 6-keto-$PGF_{1\alpha}$ and platelet aggregation in blood plasma were investigated. Result : Compared with sham group, serum cTnT and CK-MB contents in model group increased significantly (P<0.01). Compared with model group, myocardial infarction size and serum cTnT and CK-MB contents in aqueous effective component of *S. miltiorrhiza* group, aqueous effective component of *C. tinctorius* group and aqueous effective components compatibility of *S. miltiorrhiza* and *C. tinctorius* groups decreased significantly. Aqueous effective component of *S. miltiorrhiza* increased the level of 6-keto-$PGF_{1\alpha}$, as well as decreased content of TXB_2 and inhibited platelet aggregation (P<0.01). Aqueous effective component of *C. tinctorius* also decreased the content TXB_2 (P<0.01). Improved extent of some detected markers in aqueous effective components compatibility of *S. miltiorrhiza* and *C. tinctorius* groups were better than that of Danhong injection group. Conclusion : Effective components compatibility of aqueous extracts from *S. miltiorrhiza* and *C. tinctorius* may reduce myocardial infarct size and leakage of myocardial enzyme, and increase the level of 6-keto-PGF1α, so as to inhibit platelet aggregation and prevent thrombosis, the result of which is to reduce myocardial ischemic reperfusion injury.

keywords:myocardial ischemia ischemic reperfusion injury salvianolic acid B hydroxysafflor yellow A platelet aggregation

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