Polyethylene Glycol-20k Improves Microcirculation in a Rat Model of Cardiopulmonary Resuscitation

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Background

Polyethylene Glycol-20k (PEG-20k) improves the microcirculation by alleviating ischemia-induced cell swelling, decompressing capillaries, and enhancing capillary oxygen transfer in a rat model of hemorrhagic shock. Impaired microcirculatory flow is associated with poor outcomes after cardiac arrest. We previously demonstrated that PEG-20k improves survival, neurologic, and myocardial function post arrest but the mechanism is unknown. The aim of this study is to investigate the effects of PEG-20k administration on the microcirculation in a rat model of cardiac arrest. We hypothesize that administration of PEG-20k during CPR improves microcirculation in a rat model of CPR.

Methods

Twenty male Sprague-Dawley rats were randomized into two groups (n=10 for each group): PEG-20k and control. PEG-20k (10%, 2ml) and vehicle (saline) were administered to the treatment and control group respectively at the beginning of CPR by continuous intravenous infusion. Ventricular fibrillation was induced and untreated for 6 min followed by 8 min of CPR and then defibrillation was attempted. Buccal microcirculation was assessed by a sidestream dark-field imaging device at baseline, 1, 3 and 6 hours after return of spontaneous circulation.

Results

All animals were resuscitated successfully. Buccal perfused vessel density (PVD) and microcirculatory flow index (MFI) were significantly improved in the PEG-20k group compared to the control group after CPR (Figure 1).

Conclusions

Administration of PEG-20k following CPR improves the microcirculation in a rat model of CPR. This effect may account, in part, for the improved outcomes in rats when treated with PEG-20k.

References


Disclosure

None