



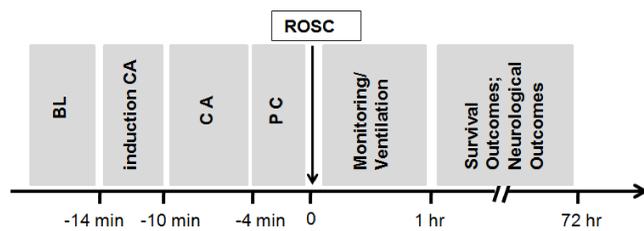
Background

Dichloroacetate acid (DCA) is a pyruvate dehydrogenase kinase inhibitor, which activates pyruvate dehydrogenase, and increases cell ATP production by promoting influx of pyruvate into the Krebs cycle. In this study, we investigated the effects of DCA on post-resuscitation neurological injury in a rat model of asphyxia cardiac arrest (ACA).

Methods

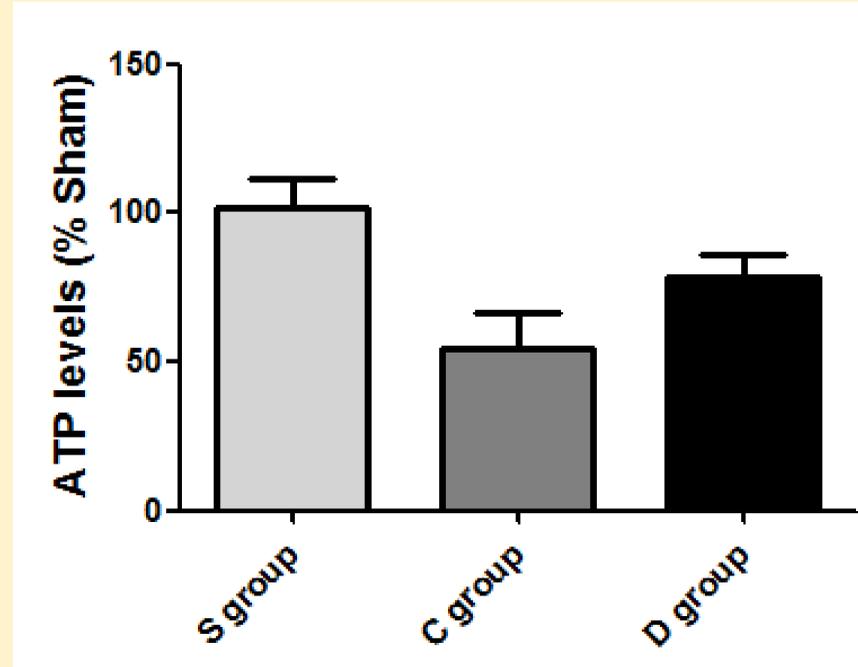
The animals were randomized into 3 groups after restoration of spontaneous circulation (ROSC): Control group (C, N = 12), DCA intervention group (D, N = 12), and Sham group (S, N = 6). Animals in both C and D groups were randomly divided into 2 subgroups: ROSC 6 hours (n = 6) and ROSC 72 hours (n = 6). DCA (80 mg/kg) or placebo was administered by intraperitoneal injection at 30 minutes after ROSC. The neurologic deficit scores (NDS) were measured at 24 hours, 48 hours and 72 hours. The brain ATP levels of animals in S group and ROSC 6 hours subgroups were measured at 6 hours.

Experimental Protocol



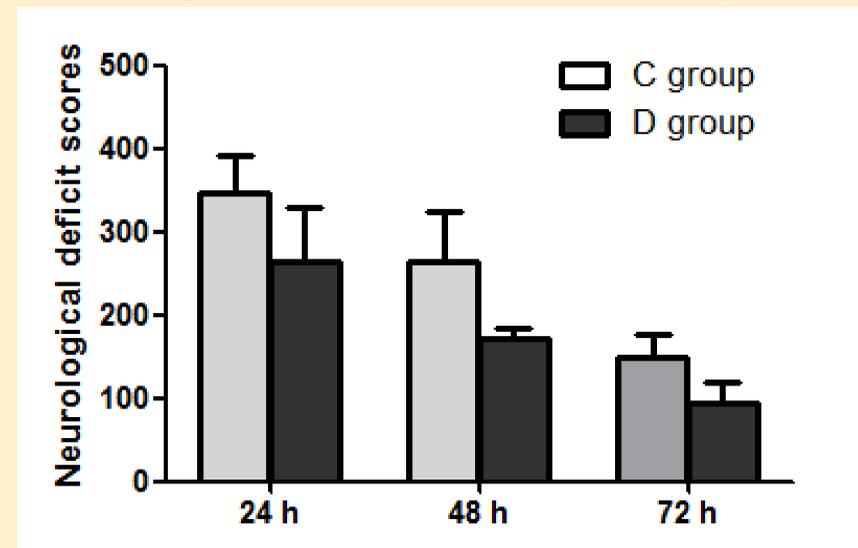
Results

Figure 1. Changes of ATP levels after restoration of spontaneous circulation



S group, Sham group; C group, control group; D group, DCA intervention group. * $p < .05$ vs. the Sham group.

Figure 2. Changes of neurologic deficit scores after restoration of spontaneous circulation



C group, control group; D group, DCA intervention group. * $p < .05$ vs. the C group.

Experimental Protocol

ACA was induced by endotracheal tube (ETT) clamping. After 11 minutes of clamping (including cardiac arrest time 6 minutes, defined mean aortic pressure ≤ 25 mmHg), CPR was initiated with the ETT opening. BL, baseline; CA, cardiac arrest; PC, precordial compression.

Results

No significant difference in the duration of asphyxia before mean aortic pressure < 30 mm Hg were observed in both groups [(4.7 \pm 0.3) min vs. (4.7 \pm 0.4) min, $P = 1.0$]. The brain ATP levels of animals in C group were significantly lower than those in D group (Figure 1). Significantly lower NDS at 24 h, 48 h and 72 h were achieved by animals treated with DCA in comparison with control animals (Figure 2).

Conclusions

DCA improves neurological outcome after ACA via increases of ATP levels in brain.

References

- Bersin R, Stacpoole P, Kamimura N, Cbarlotte N, et al. American Heart Journal. 1997; 134: 842-855.
- Marangos P, Turkel C, Dziewanowska Z, et al. Exp Opin Invest Drugs. 1999; 8(4): 373-382.

Disclosure

None