

Abstract:

BACKGROUND: Aims of the study were to determine the effects of humerus intraosseous (HIO) versus intravenous (IV) administration of epinephrine in a hypovolemic, pediatric pig model. We compared concentration maximum (C_{max}), time to maximum concentration (T_{max}), mean concentration (MC) over time and return of spontaneous circulation (ROSC).

METHODS: Pediatric pig were randomly assigned to each group (HIO (n=7); IV (n=7); cardiopulmonary resuscitation (CPR)+defibrillation (defib) (n=7) and CPR-only group (n=5)). The pig were anesthetized; 35% of the blood volume was exsanguinated. pigs were in arrest for 2 min, and then CPR was performed for 2 min. Epinephrine 0.01 mg/kg was administered 4 min postarrest by either route. Samples were collected over 5 min. After sample collection, epinephrine was administered every 4 min or until ROSC. The C_{max} and MC were analyzed using high-performance liquid chromatography. Defibrillation began at 3 min postarrest and administered every 2 min or until ROSC or endpoint at 20 min after initiation of CPR.

RESULTS: Analysis indicated that the C_{max} was significantly higher in the IV versus HIO group (p=0.001). T_{max} was shorter in the IV group but was not significantly different (p=0.789). The MC was significantly greater in the IV versus HIO groups at 90 and 120 s (p<0.05). The IV versus HIO had a significantly higher MC (p=0.001). χ^2 indicated the IV group (5 out of 7) had significantly higher rate of ROSC than the HIO group (1 out of 7) (p=0.031). One subject in the CPR+defib and no subjects in the CPR-only groups achieved ROSC.

DISCUSSION: Based on the results of our study, the IV route is more effective than the HIO route.

Reference:

Neill, M.J., Burgert, J.M., Blouin, D., Tigges, B., Rodden, K., Roberts, R., Anderson, P., Hallquist, T., Navarro, J., O'Sullivan, J. and Johnson, D. (2020) Effects of humeral intraosseous epinephrine in a pediatric hypovolemic cardiac arrest porcine model. *Trauma Surgery & Acute Care Open*. 5(1), p.e000372. doi: 10.1136/tsaco-2019-000372.

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