

This study compared the effects of vasopressin via tibial intraosseous (IO) and intravenous (IV) routes on maximum plasma concentration (Cmax), the time to maximum concentration (Tmax), return of spontaneous circulation (ROSC), and time to ROSC in a hypovolemic cardiac arrest model” Fulkerson et al (2016).

Abstract:

INTRODUCTION: This study compared the effects of vasopressin via tibial intraosseous (IO) and intravenous (IV) routes on maximum plasma concentration (Cmax), the time to maximum concentration (Tmax), return of spontaneous circulation (ROSC), and time to ROSC in a hypovolemic cardiac arrest model.

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METHODS: This study was a randomized prospective, between-subjects experimental design. A computer program randomly assigned 28 Yorkshire swine to one of four groups: IV (n=7), IO tibia (n=7), cardiopulmonary resuscitation (CPR) + defibrillation (n=7), and a control group that received just CPR (n=7). Ventricular fibrillation was induced, and subjects remained in arrest for two minutes. CPR was initiated and 40 units of vasopressin were administered via IO or IV routes. Blood samples were collected at 0.5, 1, 1.5, 2, 2.5, 3, and 4 minutes. CPR and defibrillation were initiated for 20 minutes or until ROSC was achieved. We measured vasopressin concentrations using high-performance liquid chromatography.

RESULTS: There was no significant difference between the IO and IV groups relative to achieving ROSC (p=1.0) but a significant difference between the IV compared to the CPR+ defibrillation group (p=0.031) and IV compared to the CPR-only group (p=0.001). There was a significant difference between the IO group compared to the CPR+ defibrillation group (p=0.031) and IO compared to the CPR-only group (p=0.001). There was no significant difference between the CPR + defibrillation group and the CPR group (p=0.127). There was

no significant difference in Cmax between the IO and IV groups ($p=0.079$). The mean \pm standard deviation of Cmax of the IO group was $58,709 \pm 25,463$ pg/mL compared to the IV group, which was $106,198 \pm 62,135$ pg/mL. There was no significant difference in mean Tmax between the groups ($p=0.084$). There were no significant differences in odds of ROSC between the tibial IO and IV groups.

CONCLUSION: Prompt access to the vascular system using the IO route can circumvent the interruption in treatment observed with attempting conventional IV access. The IO route is an effective modality for the treatment of hypovolemic cardiac arrest and may be considered first line for rapid vascular access.

Full Text

Reference:

Fulkerson, J., Lowe, R., Anderson, T., Moore, H., Craig, W. and Johnson, D. (2016) Effects of Intraosseous Tibial vs. Intravenous Vasopressin in a Hypovolemic Cardiac Arrest Model. The Western Journal of Emergency Medicine. 17(2), p.222-8.

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