

The purpose of this study was to evaluate the effects of HIO and IV vasopressin, on the occurrence, odds, and time of return of spontaneous circulation (ROSC) and pharmacokinetic measures in a swine model of VF” Burgert et al (2017).

Abstract:

INTRODUCTION: The American Heart Association (AHA; Dallas, Texas USA) and European Resuscitation Council (Niel, Belgium) cardiac arrest (CA) guidelines recommend the intraosseous (IO) route when intravenous (IV) access cannot be obtained. Vasopressin has been used as an alternative to epinephrine to treat ventricular fibrillation (VF).

Hypothesis/Problem Limited data exist on the pharmacokinetics and resuscitative effects of vasopressin administered by the humeral IO (HIO) route for treatment of VF. The purpose of this study was to evaluate the effects of HIO and IV vasopressin, on the occurrence, odds, and time of return of spontaneous circulation (ROSC) and pharmacokinetic measures in a swine model of VF.

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METHODS: Twenty-seven Yorkshire-cross swine (60 to 80 kg) were assigned randomly to three groups: HIO (n=9), IV (n=9), and a control group (n=9). Ventricular fibrillation was induced and untreated for two minutes. Chest compressions began at two minutes post-arrest and vasopressin (40 U) administered at four minutes post-arrest. Serial blood specimens were collected for four minutes, then the swine were resuscitated until ROSC or 29 post-arrest minutes elapsed.

RESULTS: Fisher’s Exact test determined ROSC was significantly higher in the HIO 5/7 (71.5%) and IV 8/11 (72.7%) groups compared to the control 0/9 (0.0%; $P=.001$). Odds ratios of ROSC indicated no significant difference between the treatment groups ($P=.68$) but significant differences between the HIO and control, and the IV and control groups ($P=.03$ and $.01$, respectively). Analysis of Variance (ANOVA) indicated the mean time to ROSC for HIO and IV was 621.20 seconds (SD=204.21 seconds) and 554.50 seconds (SD=213.96 seconds), respectively, with no significant difference between the groups ($U=11$; $P=.22$). Multivariate Analysis of Variance (MANOVA) revealed the maximum plasma concentration (Cmax) and time to maximum concentration (Tmax) of vasopressin in the HIO and IV groups was 71753.9 pg/mL (SD=26744.58 pg/mL) and 61853.7 pg/mL (SD=22745.04 pg/mL); 111.42 seconds (SD=51.3 seconds) and 114.55 seconds (SD=55.02 seconds), respectively. Repeated measures ANOVA indicated no significant difference in plasma vasopressin concentrations between the treatment groups over four minutes ($P=.48$).

CONCLUSIONS: The HIO route delivered vasopressin effectively in a swine model of VF. Occurrence, time, and odds of ROSC, as well as pharmacokinetic measurements of HIO vasopressin, were comparable to IV.

Reference:

Burgert, J.M., Johnson, A.D., Garcia-Blanco, J., Fulton, L.V. and Loughren, M.J. (2017) The Resuscitative and Pharmacokinetic Effects of Humeral Intraosseous Vasopressin in a Swine Model of Ventricular Fibrillation. *Prehospital and Disaster Medicine*. March 8th. .

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