This study measured mean plasma concentration over 5 minutes, maximum plasma concentration (Cmax), and time to maximum concentration (Tmax) of amiodarone administered by the sternal IO (SIO), tibial IO (TIO), and IV routes in a swine model of VF with ongoing CPR” Burgert et al (2017).

Abstract:

OBJECTIVE: The pharmacokinetics of IO administered lipid soluble amiodarone during ventricular fibrillation (VF) with ongoing CPR are unknown. This study measured mean plasma concentration over 5 minutes, maximum plasma concentration (Cmax), and time to maximum concentration (Tmax) of amiodarone administered by the sternal IO (SIO), tibial IO (TIO), and IV routes in a swine model of VF with ongoing CPR.

METHODS: Twenty-one Yorkshire-cross swine were randomly assigned to three groups: SIO, TIO, and IV. Ventricular fibrillation was induced under general anesthesia. After 4 minutes in VF, 300 mg amiodarone was administered as indicated by group assignment. Serial blood specimens collected at 30, 60, 90, 120, 150, 180, 240, and 300 seconds were analyzed using high performance liquid chromatography with tandem mass spectrometry.

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RESULTS: The mean plasma concentration of IV amiodarone over 5 minutes was significantly higher than the TIO group at 60 seconds (P = 0.02) and 90 seconds (P = 0.017) post-injection. No significant differences in Cmax between the groups were found (P <0.05). The Tmax of amiodarone was significantly shorter in the SIO (99 secs) and IV (86 secs) groups compared to the TIO group (215 secs); P = 0.002 and P = 0.002, respectively.

CONCLUSIONS: The SIO and IV routes of amiodarone administration were comparable. The TIO group took nearly three times longer to reach Tmax than the SIO and IV groups, likely indicating depot of lipid-soluble amiodarone in adipose-rich tibial yellow bone marrow. The SIO route was more effective than the TIO route for amiodarone delivery in a swine model of VF with ongoing CPR. Further investigations are necessary to determine if the kinetic differences found between the SIO and TIO routes in this study affect survival of VF in humans.

Reference: