Intraosseous administration of antibiotics during shock and resuscitation

Gunnar Strandberg[1], Miklós Lipcsey[1], Anders Larsson[2] and Mats Eriksson[1]

[1]Department of Surgical Sciences, Anesthesiology and Intensive Care. Uppsala University, Uppsala. [2]Department of Medical Sciences, Clinical Chemistry. Uppsala University, Uppsala

(285 words, title and references not included)

Introduction: Intraosseous (IO) cannulation is indicated when intravenous (IV) access is not quickly established in a medical emergency with need for fluid and/or drug administration, for example during cardiopulmonary resuscitation or in shock of various origin[1,2]. It is important to know if drug uptake is adequate under such circumstances. Cathecolamines, commonly used in resuscitation, have been reported to decrease bone marrow blood flow[3]. We have studied plasma concentrations of antibiotics administered IO in septic and hemorrhagic shock and after IO adrenaline administration[4].

Methods: 8 anesthetized pigs were subjected to experimental septic shock by endotoxin infusion and received injections of cefotaxime, 70 mg/kg and gentamicin, 7 mg/kg either IO (n=4) or IV (n=4). Plasma concentrations were analyzed at 5, 15, 30, 60, 120 and 180 minutes. In a second experiment, 10 anesthetized pigs were bled 50% of their calculated blood volume after which they received IO injection of gentamicin 7 mg/kg. Half of the animals received 3 doses, each 10 µg/kg, of adrenaline IO immediately prior to antibiotic administration. Plasma concentrations of gentamicin were analyzed at 5, 15 and 30 minutes.

Results: High peak plasma drug concentrations were reached in all animals. There was no significant difference between concentrations after IO and IV administration during endotoxemia (mean AUC (mg x h x L^{-1}) cefotaxime; IV 116, 5 IO 108, 1, gentamicin; IV 32, 2, IO 28, 1) [4]. In hemorrhagic shock, IO adrenaline administration did not affect plasma concentrations of subsequently administered gentamicin IO. Mean concentrations at 5 min (mg x L^{-1}) were 26, 4 (adrenaline) and 26, 6 (control).

Conclusions: Uptake of the studied drugs after intraosseous administration was adequate during experimental endotoxemic and hemorrhagic shock. Previous repeated adrenaline administration did not impair uptake.

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