

Title: COMPARATIVE LIDOCAINE PHARMACOKINETICS DURING CAUDAL ANESTHESIA IN YOUNG AND GERIATRIC PATIENTS

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The anesthesia literature is vague about the use of caudal anesthesia (for surgery) in the elderly age group. There is uncertainty regarding the dose of drug, success of neural blockade, and systemic toxicity. Only one study<sup>1</sup> included pharmacokinetic data from the geriatric population and this work compared different local anesthetics and not the efficacy of the technique. We designed our study to answer two questions: can a lidocaine caudal provide adequate anesthesia without toxicity for lower abdominal and perineal surgery, and, are there pharmacokinetic differences of caudal anesthesia between young and old patients?

Following approval of the Human Subjects Investigation Committee, patients in this study were arbitrarily divided into two groups according to age: 1) < 40 years - 7 males (mean age 30.2 years S.D.  $\pm$  7.0) and mean weight 77.5 kg (S.D.  $\pm$  10). 2)  $\geq$  60 years - 12 males (mean age 63.7 years S.D.  $\pm$  4.8) and mean weight 84.8 kg (S.D.  $\pm$  15). All subjects were free of cardiac, renal or hepatic disease. Lidocaine (2% with epinephrine 1:200,000) 6 mg/kg in a single dose, was administered by caudal catheter (inserted 10 cm) to each patient. The resulting block reached a mean sensory dermatome level of T 8.8 (S.D.  $\pm$  3.6) in the < 40 and T 5.8 (S.D.  $\pm$  2.4) in the  $\geq$  60. There was no clinical evidence of lidocaine toxicity. Peripheral samples were obtained at pre-injection and serially thereafter for 120 minutes after injection. Serum lidocaine levels were measured by high-pressure liquid chromatography. In the < 40 group, the mean peak lidocaine level of 2.07 (S.D.  $\pm$  0.51)  $\mu$ g/ml occurred at 60 minutes, and in the  $\geq$  60 group, the mean peak lidocaine level of 2.64 (S.D.  $\pm$  1.25)  $\mu$ g/ml occurred at 25 minutes. For the group < 40 there was a significant ( $p < 0.1$ ) decline in serum level by 120 minutes. However, the group  $\geq$  60 had a mean level at 120 minutes of 2.24 (S.D.  $\pm$  0.88)  $\mu$ g/ml which was not different from the 25 minute level ( $p > 0.1$ ). In half the group  $\geq$  60 the level at 120 minutes exceeded the level at 25 minutes. Thus the pharmacokinetic profile for the group < 40 resembles that seen following a bolus injection whereas the group  $\geq$  60 resembles an infusion. The highest lidocaine level was 6.1  $\mu$ g/ml; lidocaine levels greater than 3  $\mu$ g/ml were found in only

two patients both  $\geq$  60. Lidocaine caudal anesthesia (6 mg/kg plus epinephrine) appears to be an effective and safe technique in the aged male patient resulting in a consistent block to the mid-thoracic region with lidocaine levels below the toxic range. However, the serum lidocaine level remains constant for two hours raising the possibility that repeated injection may cause lidocaine toxicity.

#### Reference

1. Cousins MJ, Bromage PR: A comparison of the hydrochloride and carbonated salts of lignocaine for caudal anesthesia in out-patients. *Br J Anaesth* 43:1149-1154, 1979

