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ICVTS on-line discussion A

Title: The safety of using millimolar doses of lidocaine as cardioplegia

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eComment: We read with interest the paper by Yamaguchi and colleagues [1] that studies the effect of lidocaine-magnesium blood cardioplegia in an in vivo canine model. The interest of this study lies in the fact that it addresses the safety issue of infusing millimolar doses of lidocaine as a cardioplegic agent. This is done by measuring the serum concentration throughout the procedure, but particularly around the time when cardiopulmonary bypass will be discontinued. There appeared, however, to be a very narrow margin of safety because it took 30 minutes for lidocaine to reach safe levels and this will be largely dependent on the renal clearance of the drug, which could be less effective during cardiopulmonary bypass. In reference 10 (incorrectly cited!) Corvera and colleagues [2] used lower lidocaine concentrations in combination with adenosine. Thus, it is possible that, in this study, the use of a higher magnesium concentration (possibly closer to the concentration used in the St. Thomas’ Hospital cardioplegia of 32 mEq/L (16 mmol/l), which would act to block the L-type calcium channels) may have allowed a reduction in their lidocaine concentration. However, serum concentrations of lidocaine were not measured in the study by Corvera and coworkers.

Another point of interest is the formulation of the potassium cardioplegia used at the authors’ institute; the calcium concentration stated is considerably higher than most cardioplegic solutions, at 8 mEq/L (4 mmol/l)! What was the reason behind this? In addition, why were the sodium and potassium concentrations in the Lidocaine-Mg solution so low? Moreover, there are numerous errors of fact throughout the manuscript. For example, the lidocaine concentration used in the maintenance infusion is cited as 0.65 mmol/l in Table 1 and 0.43 mmol/l in the discussion text. The lidocaine serum concentration is cited as µg/ml in Fig 3 and g/ml in the text. It is also surprising that statements made in the Introduction are not supported by references. These, and many other points, should have been brought to the attention of the authors by the reviewers so that they could be corrected or explained.

References
