[GA2-57] Effect of Dexmedetomidine on QT Interval in Pediatric Patients Undergoing General Anesthesia

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Background: Dexmedetomidine is an α2-adrenergic agonist that is being used with increasing frequency in pediatric patients. Several desirable physiologic properties have been reported including sedation, limited respiratory effects, and decreased analgesic requirements. The primary adverse effects are related to its complex cardiovascular effects of hypertension, hypotension, and bradycardia. Although it has been shown to have anti-arrhythmic properties, its effects on the QT interval have not been studied. The current study evaluates the effects of dexmedetomidine on the QT interval in the pediatric population.

Methods: This study was a prospective, case-controlled study. After IRB approval, pediatric patients presenting for anesthetic care were divided into two groups: dexmedetomidine (D) and control (C) groups based on whether the anesthetic technique was to include dexmedetomidine. Anesthetic care was standardized between the groups except for the administration of dexmedetomidine in group D. A total of 3 ECG's were obtained on each patient at fixed time intervals: 1) a baseline ECG (T1) prior to anesthetic induction, 2) after induction of general anesthesia with end-tidal sevoflurane = 4-5% and placement of an intravenous catheter (T2), and 3) in the D group, 2-3 minutes after administration of 0.5 µg/kg of dexmedetomidine (T3D) and in the C group, 2-3 minutes after placement of an IV catheter (T3C). In T3C and T3D, the end-tidal sevoflurane was maintained at 4-5%. No other medications were administered during the entire study period. Statistical analysis included an analysis of variance.

Results: The study included 23 patients ranging in age from 3 to 16 years (9.7 ± 4.6 years). There were 13 patients in group C and 10 in group D. There were no differences in the demographics between the 2 groups. In both groups, there was progressive lengthening of the QTc in the ECGs of the patients while receiving sevoflurane (T2 or T3C versus T1). However, there was a decrease in the QTc following the administration of dexmedetomidine when compared to the prior ECGs (T3D versus T1, and T2). The QTc of the dexmedetomidine group was also less than that in the control group at point 3 (T3D versus T3C) (Table 1).

Discussion: We noted a progressive lengthening of the QT interval following the administration of sevoflurane. However, the QTc returned to baseline (awake) values following the administration of dexmedetomidine. Given its complex effects on the conduction system, it is unknown if this accounts for the anti-arrhythmic effects of dexmedetomidine. In summary, dexmedetomidine does not prolong the QTc interval and in fact, shortens it.

References

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Group	T_1	T_2	T_3
Dexmedetomidine (D)	420 ± 16	427 ± 24*	415 ± 16 (T_{3D})#
Control (C)	417 ±17	425 ± 20*	429 ± 24 (T_{3C})*

Table 1: QTc in milliseconds. The data are presented as the mean ± SD.
*P<0.05 versus baseline; #P=NS versus baseline