CIRCULATION

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INTERACTION OF VOLATILE ANESTHETICS AND ANTICHOLINERGICS

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Introduction. Atropine and/or glycopyrrolate are commonly used in pediatric anesthesia to prevent succinylcholine-induced bradycardia in children. The present study was undertaken to compare the effects of atropine and glycopyrrolate given intravenously after induction of anesthesia with halothane and enflurane.

Methods. This study was conducted in 40 children (A.S.A. Class I) scheduled for elective surgery requiring use of succinylcholine to facilitate endotracheal intubation. Each patient was randomly assigned to one of 4 groups: Group I – injection of atropine after induction with halothane, Group II – injection of glycopyrrolate after induction with halothane, Group III – injection of atropine after induction with enflurane, and Group IV – injection of glycopyrrolate after induction with enflurane. Premedication and dose of anticholinergic medication was standardized on the basis of body weight. End tidal CO₂ was continuously monitored and ventilation controlled to eliminate effects of hypo- or hypercarbia on cardiac rate and rhythm. EKG Lead II was recorded to study any changes in cardiac rhythm.

Results. There was no significant difference in mean heart rate before injection of anticholinergic drugs in the four groups. Heart rate increased in all cases after anticholinergic drugs and this increase was significantly higher in children receiving halothane anesthesia as compared to those under enflurane anesthesia (Figure 1). Change in inspired concentration of halothane from 1.2% to 2% did not effect the degree of tachycardia produced after injection of atropine or glycopyrrolate. Although there was greater increase in heart rate with glycopyrrolate as compared to atropine - this difference was not statistically significant. The only arrhythmia noted was development of junctional tachycardia in 17 out of 40 children. There was no significant difference in frequency of occurrence of this rhythm disturbance in the four groups studied. However, time interval between injection of anticholinergic medication and onset of junctional tachycardia was much shorter in patients anesthetised with halothane (mean 36.4 seconds) as compared to those receiving enflurane (mean 151 seconds). This difference was statistically significant.

Statistical Analysis:
Base line (before anticholinergic drug) heart rates - no significant difference
Group I (halothane and atropine) vs. Group III (enflurane and atropine)...significant P < 0.05
Group II (halothane and rohitinl) vs. Group IV (enflurane and rohitinl)...significant P < 0.01
Groups I and II vs. Groups III and IV... Significant P < 0.01

Discussion. Our findings of greater tachycardia following I.V. glycopyrrolate and development of junctional tachycardia following anticholinergic medication during anesthesia are in keeping with previously reported studies. Striking differences in the positive chronotropic effect of anticholinergic drugs during halothane anesthesia compared to that during enflurane anesthesia has not been reported, and the exact mechanism of this observation remains to be sought.

References: