Perioperative hemodynamic changes in children receiving intraoperative dexmedetomidine sedation for tonsillectomy and adenoidectomy

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Abstract

Dexmedetomidine is an alpha-2 adrenergic receptor agonist that is commonly used in surgical procedures. Despite its common use, dexmedetomidine is not FDA approved for the pediatric population. The drug is successfully used as an off-label medication in surgical procedures in pediatric patients; however, there are only a limited number of studies that examine the safety of dexmedetomidine for pediatric patients. To further examine the safety of the drug, we conducted a retrospective chart review to examine how the use of intraoperative dexmedetomidine affected perioperative hemodynamics in children who underwent a tonsillectomy and adenoidectomy procedure. Patient’s demographics, intraoperative medications, and physiologic data were collected. We found there was no significant difference in the change in heart rate between the test and control patients (p=0.091). Similarly, we found there was no significant difference in the percent change of blood pressure between the test and control patients (systolic p=0.578, diastolic p=0.638). Based on our results, we concluded that dexmedetomidine does not significantly affect the perioperative heart rate and blood pressure in relatively healthy pediatric patients receiving sedation for routine surgical procedures.

Introduction

Dexmedetomidine, an alpha-2 agonist, is a relatively unique analgesic that provides sedation without significant risk of respiratory depression. Although the Food and Drug Administration (FDA) approved the use of dexmedetomidine for surgical procedures in the adult population, its use is currently not approved for the pediatric population. Despite the lack of FDA approval, dexmedetomidine is being successfully used in surgical procedures in pediatric patients. However, a comprehensive understanding of the effects of dexmedetomidine in surgical procedures in the pediatric population is not well documented. A recent study examined the effect of dexmedetomidine on hemodynamics in patients undergoing noncardiac surgical procedures, and showed that dexmedetomidine use was not associated with intraoperative hypotension or bradycardia. In our study, we examined the hemodynamic safety of dexmedetomidine in the pediatric population. We analyzed the perioperative changes in heart rate and blood pressure in children who received intraoperative dexmedetomidine for tonsillectomy and adenoidectomy, one of the most common routine surgical procedures in pediatric patients.

Methods

The study was conducted as a single-center retrospective chart review of the pediatric patients who received tonsillectomy and adenoidectomy (T&A). Patients were excluded if they had an ASA score of three or greater. To evaluate the hemodynamic effects of the drug, we collected the patients’ physiologic data, in particular heart rate (HR) and blood pressure (BP). There were 77 patients in the data set, among which 50 patients were from the test group and 27 patients were from the control group. For HR, Wilcoxon signed-rank test was used to compare the two groups. For BP, the percentage of change from baseline value was modeled through a linear mixed-effect model.

Results

Figure 1. Means and error bars for percentage change from baseline value of SBP. The interaction term was not statistically significant (p = 0.578). The estimated uniform difference in percent change (test – control) is -1% (95% CI: -7% to 4%, p = 0.593) at all time points.

Figure 2. Means and error bars for percentage change from baseline value of DBP. The interaction term was not statistically significant (p = 0.638). The estimated uniform difference in percent change (test – control) is 6% (95% CI: -13% to 2%, p = 0.151) at all time points.

Discussion

Patients who received dexmedetomidine had a smaller change in heart rate compared to the control group when examining pre-operative and post-operative measurements. However, when looking at the change of heart rate between the test and control groups, there was no significant difference. Similarly, analysis of the blood pressure (both systolic and diastolic) showed no significant differences in the percent change between the control and test groups. Our results were consistent with the study that showed that dexmedetomidine was not associated with intraoperative hypotension or bradycardia in patients undergoing noncardiac surgical procedures. In our study, we were unable to control for every intraoperative medication administered to the patient. A future study with a larger sample size may account for the different intraoperative medications.

Conclusion

Dexmedetomidine can be safely used intraoperatively in relatively healthy pediatric patients undergoing routine surgeries without significantly affecting perioperative hemodynamics.

References


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cardiac catheterization, abdominal aortic aneurysm, thoracic surgery, surgical outcome, surgical complication