

# Impact of Dexmedetomidine on Pediatric Agitation in the Postanesthesia Care Unit

Hongyan Li, MSc, Longming Zhang, MSc, Min Shi, BM, Shengqiang Yang, MSc, Shengde Li, MSc, Shenqiang Gao, MD

**Purpose:** This study aims to investigate the impacts of dexmedetomidine (DEX) on agitation in the postanesthesia care unit (PACU) for pediatric patients undergoing tonsillectomy.

**Design:** Eighty-two pediatric patients with elective tonsillectomy were randomly divided into the DEX group (group D) and the control group (group C). All patients' surgery in the two study groups were completed under tracheal cannula-based general anesthesia. Group D was infused 0.2 mcg/kg/hour DEX. The operation time, extubation time, PACU time, number of cases with nausea and vomiting, hemodynamic changes, and doses of rescue fentanyl, as well as every 10-minute observational pain scoring, and emergence agitation score in PACU, of the two groups were recorded.

**Methods:** Chi-square and Fischer exact tests were applied for categorical variables.

**Finding:** The maximum observational pain scoring and emergence agitation score of group D at 0, 10, and 20 minutes in PACU were significantly lower than group C ( $P < .01$ ); the rescue doses of fentanyl and incidence of severe agitation in PACU in group D were significantly reduced than group C ( $P < .01$ ). Group D showed significantly less cases with nausea and vomiting than group C ( $P < .05$ ).

**Conclusions:** Low-dose DEX could significantly reduce the delirium and agitation in the PACU stage of pediatric tonsillectomy, and there were no untoward hemodynamic events in this study of 80 patients.

**Keywords:** dexmedetomidine, pediatric patient, tonsillectomy, postoperative agitation, OPS, emergence agitation, emergence delirium.

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**POSTOPERATIVE AGITATION AND DELIRIUM** are common complications of pediatric general anesthesia, especially with inhalation anesthesia. The incidences of postoperative agitation and delirium reported in the literature are inconsistent,

ranging from 18% to 80%.<sup>1,2</sup> Postoperative agitation and delirium might delay postanesthesia care unit (PACU) discharge, reduce caregiver satisfaction, and increase workload and risk for health care workers.

Hongyan Li, MSc, Department of Anesthesiology, Tai'an Central Hospital, Tai'an, China; Longming Zhang, MSc, Department of Anesthesiology, Tai'an Central Hospital, Tai'an, China; Min Shi, BM, Department of Anesthesiology, Tai'an Tumour Hospital, Tai'an, China; Shengqiang Yang, MSc, Department of Anesthesiology, Tai'an Central Hospital, Tai'an, China; Shengde Li, MSc, Department of Anesthesiology, Tai'an Central Hospital, Tai'an, China; and Shenqiang Gao, MD, Department of Anesthesiology, Tai'an Central Hospital, Tai'an, China.

**Ethics:** This study was approved by the Ethics Committee of Tai'an Central Hospital, Shandong (registration date: March 22, 2014 and registration no.: 2014032202).

**Funding:** Only departmental resources were used.  
**Conflict of interest:** None to report.

Address correspondence to Shenqiang Gao, Department of Anesthesiology, Tai'an Central Hospital, No. 29 Long Tan Road, Tai'an 271000, China; e-mail address: [ShenqiangGao@126.com](mailto:ShenqiangGao@126.com).

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Tonsillectomy is a common ear, nose, and throat surgery commonly associated with throat pain and discomfort, as well as postoperative agitation and delirium, which may result in edema, hemorrhage, and asphyxia with.<sup>3,4</sup> Desflurane is the inhalation anesthetic with the fastest reanimation speed<sup>5-7</sup> and commonly used in pediatric anesthesia; however, the high incidence of agitation and delirium after desflurane-based anesthesia prevents its widespread application.<sup>8-10</sup> As a novel highly selective adrenal  $\alpha_2$  receptor agonist, dexmedetomidine (DEX) could reduce surgical stimulation that cause stress responses. Often used as an adjuvant drug for general anesthesia, DEX has a synergistic effect on sedation, analgesia, and antianxiety, it may also reduce the agitation and delirium associated with sevoflurane-based anesthesia.<sup>11</sup> Schnabel et al<sup>12</sup> summarized the applications of DEX in pediatric intraoperative sedation and noted that the intravenous infusion of a loading dose of 1 to 4 mcg kg<sup>-1</sup> with a maintenance dose of 0.5 to 0.7 mcg kg<sup>-1</sup> hour<sup>-1</sup> could reduce the risks of postoperative pain; however, it could induce hemodynamic changes. The impacts of DEX on the agitation and delirium after desflurane-based anesthesia and on the hemodynamics were not reported.

This study examines the impact of continuous infusion of low-dose DEX on the intraoperative hemodynamic changes and postoperative agitation in desflurane-based pediatric tonsillectomy.

## Methods

### *General Information*

This study was a prospective, random, double-blind, and controlled trial. Ethics approval was obtained from the ethics committee of our hospital and informed consent was obtained from the pediatric patient's family members or guardian. About 82 pediatric patients with elective general anesthesia-based tonsillectomy in ears, nose, and throat of Tai'an Central Hospital from June 2014 to September 2014 were selected, among whom two patients were stopped from undergoing the surgery because of fever. Patients were aged 4 to 6 years old, weighed 12 to 30 kg, and were classified American Society of Anesthesiologists (ASA) grade I or II. Exclusion criteria included presence of preoperative mental and neurologic disorders, abnormal hepatonephric functions, presence of

congenital heart disease and diseases in cardiac conduction system, or other diseases. Patients were randomized into two groups, group D (n = 40, intravenously infused DEX, 0.2 mcg/kg/hour; Jiangsu Hengrui Medicine Co Ltd, Zhunzi H20090248, batch no. 14073032) and group C (n = 40, intravenously infused the same amount of physiologic saline), by computer-generated random numbers in a double-blinded fashion. The random number sequence was generated by an Internet program (<http://www.random.org>). The time to awakening and the length of stay in the PACU were recorded. All patients and family members were satisfied with care received during the hospital stay.

### *Anesthesia Method*

All patients were preoperatively fasted for 8 hours and water deprived for 4 hours. Intravenous access was established on the ward. After entering the surgery room, the patient was routinely monitored via electrocardiogram, peripheral capillary oxygen saturation, mean arterial pressure (MAP), and partial pressure of end-tidal carbon dioxide (PetCO<sub>2</sub>). Intubation was performed after anesthesia induction with 3 mg/kg of propofol, 0.3 mg/kg of rocuronium, and 1 mcg/kg of fentanyl, with mechanical ventilation (14 times and greater per minute and tidal volume of 6 mL/kg). Anesthesia was maintained with desflurane (minimum alveolar concentration ranges from 5.6% to 6%) plus 50% air-oxygen mixed gas with the PetCO<sub>2</sub> maintained at 30 to 35 mm Hg. Group D was continuously infused with 0.2 mcg/kg/hour of DEX after anesthesia induction until the end of the surgery, whereas group C was administered the same volume of physiologic saline. All pediatric patients of the two groups were intravenously injected with 0.01 to 0.02 mg kg<sup>-1</sup> of atropine and 5 to 10 mg of dexamethasone before the anesthesia induction, and 0.5% ropivacaine into the tonsillar fossa.

Desflurane was stopped 3 minutes before the end of the surgery, and after the surgery, intratracheal and oral secretions and blood were suctioned and the patients allowed to spontaneously breathe (tidal volume, 6 mL kg<sup>-1</sup> and greater; PetCO<sub>2</sub>, 40 to 45 mm Hg). After the swallowing reflex recovered, the patient was positioned on the right lateral position and the endotracheal tube

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