



## Taste and Smell Alterations in a Child after General Anesthesia: A Case Report and Literature Review

Yongsheng Qiu\*, Wen Jin and Yingping Jia

Department of Anesthesiology, Children's Hospital Affiliated to Zhengzhou University, Henan Children's Hospital, Zhengzhou Children's Hospital, China

### Abstract

**Rationale:** Postoperative ageusia and anosmia is a rare disease. The pathogenesis remains unknown. Here we report a child with taste and smell Alterations after general anesthesia.

**Patient Concerns:** We present a patient who is a 12-year-old boy; he underwent bilateral tonsillectomy because of suffering from chronic tonsillitis, who received a propofol-based general anesthesia. At the second day after the operation, the patient began to develop symptoms of olfactory and taste dysfunction. The patient's sense of taste has basically recovered at four weeks after surgery, which can distinguish sour and sweet bitter salty.

**Diagnoses:** Simultaneous taste and odor changes after general anesthesia indicate a drug-induced response. Overall evidence suggests that anesthetics cause postoperative ageusia and anosmia.

**Interventions:** Regular follow-up after discharge is recommended.

**Outcomes:** The taste and olfaction returned to normal after 4 weeks.

**Lessons:** The anesthesiologist should fully take the possibility of loss of taste and smell into account during anesthesia. Propofol can inhibit smell and taste pathways by stimulating the inhibitory GABAA receptor in the central nervous system. Avoid excessive air filling into the laryngeal mask or a short period of surgical avoidance of the laryngeal mask; these measures will help reduce the risk of loss of taste and smell.

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#### \*Correspondence:

Yongsheng Qiu, Department of Anesthesiology, Children's Hospital Affiliated to Zhengzhou University, Henan Children's Hospital, Zhengzhou Children's Hospital, Zhengzhou, China, E-mail: qysh66@126.com

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**Keywords:** General anesthesia; Child; Ageusia; Anosmia

### Introduction

The mechanism of taste and olfactory dysfunction after surgery is still unclear, but many studies have found that anesthetic drugs may be the biggest cause [1-4]. The patient's symptoms could be explained by a single or several factors occurring simultaneously, mucosal inflammation contributes to a decrease of the olfactory function [5], and patients with chronic sinusitis have a higher degree of erosion of the olfactory epithelium compared with controls [6]. However, these pathologies are slowly evolving and do not explain the sudden loss of smell. There are also many data supporting the loss of taste after surgery. A reported that the short-term loss of taste was discovered after general anesthesia through the laryngeal mask airway [7]. It is speculated that oppression of the laryngeal mask is the cause of lingual nerve damage. However, a study that tested the taste of 600 patients who had lost their sense of smell showed that loss of smell does not cause loss of taste [8]. If the symptoms were caused by the anesthetic medication, it could explain the sudden and simultaneous loss. Several drugs are suspected of causing ageusia and anosmia, however, the frequency of these disturbances caused by general anesthesia is unclear, and may only be resolved by awareness of such cases [9].

### Case Presentation

A 12-year-old boy, weight 37 kg, he was physically active, had a body mass index of 23.8 kg/m<sup>2</sup>, ASA physical status, he underwent bilateral tonsillectomy because of suffering from chronic tonsillitis for more than 6 months. The patient has no known drug or food allergy and showed no abnormalities suggestive of systemic disease. The sense of smell and taste were at normal levels. Preoperative medication: penehyclidine hydrochloride 0.4 mg, tropisetron hydrochloride 2 mg, midazolam 2 mg, remifentanyl hydrochloride 0.07 mg, etomidate 16 mg, cis-atracurium 6 mg, dexamethasone 5 mg. Under general anesthesia with direct vision endotracheal intubation,

ID 5.5 mm. Intraoperative medications: propofol 4~6 mg kg<sup>-1</sup>/h<sup>-1</sup>, remifentanyl hydrochloride 10~20 µg kg<sup>-1</sup>/min<sup>-1</sup>, cis-atracurium 0.1~0.15 mg kg<sup>-1</sup>/h<sup>-1</sup>. The duration of surgery was one hour. Patient-controlled analgesia formulation: sufentanil 100 µg, tropisetron hydrochloride 9 mg. At the second day after the operation, the patient began to develop symptoms of olfactory and taste dysfunction, the patient complained of the inability to discern sweet, sour, bitter, or salty, and unable to smell any odor, he had a sore throat and light dysphagia postoperatively, but there was not an intubation damaging. The magnetic resonance imaging of the cerebrum on the anterior fossa and olfactory region showed normal. Regular follow-up after discharge is recommended. The olfactory and taste function were detected after operation 1 week, 2 weeks, 4 weeks. One week after the operation, the patient complained of the inability to discern sweet, sour, bitter, or salty, and unable to smell any odor also. Two weeks after the operation, the patient's sense of taste began to recover, and he could smell strong aroma or smoke. The patient's sense of taste has basically recovered at four weeks after surgery, which can distinguish sour and sweet bitter salty. The olfactory function is also significantly improved. Isopropanol inhalation test was performed at 2 and 4 weeks postoperatively to determine olfactory function. Before the test, let the patient sniff 2 times dipped in a 70% isopropyl alcohol strips to familiarize them with the odor. After removal, allow the patient to sit with closed eyes and mouth and breathe peacefully. At the beginning of the test, the test paper was placed 30 cm below the tip of the nose of the patient. Each time the patient breathed, the test paper moved 1cm upward until the patient smelled isopropanol. The distance from the tip of the nose to the paper was recorded, and the average value was obtained three times. Greater than 15 cm is considered to be a normal sense of smell, 10 cm to 15 cm is considered to be the impairment in the sense of smell, and less than 10 cm is considered to be the loss of the sense of smell. The test result was 13 cm at 2 weeks after the operation, indicating the presence of olfactory disorder. The test result was 18 cm at 4 weeks after the operation, indicating olfaction returned to normal.

## Discussion

Some anesthetics are thought to affect the central or peripheral nervous system, and cause the injury of smell and taste nerve epithelium. Studies have shown that in addition to lidocaine and ketamine, propofol can also cause odor loss. Propofol can inhibit smell and taste pathways by stimulating the inhibitory GABA<sub>A</sub> receptor in the central nervous system. It was also shown in animal studies that propofol could disrupt the memory of taste and smell in mice, and affect the ability of odor discrimination after general anesthesia. The above indicates that propofol has the potential risk of impaired smell and taste function [10]. Propofol is commonly used for anesthesia induction and maintenance, may be that it is the cause of the loss of taste and smell in this report. Furthermore, these effects are usually temporary and in fact, the patient did regain some of his

ability to smell after four weeks. Although the phenomenon of loss of taste and smell after operation is rare, this complication can seriously affect the quality of life of patients and lead to corresponding medical problems. After loss of taste, the patient may add more polysaccharide and salt to enhance the taste, and will lead to the deterioration of diabetes or high blood pressure. Therefore, the anesthesiologist should fully take the possibility of loss of taste and smell into account during anesthesia. Avoid the use of ketamine in the nasal cavity, limit the use of lidocaine in concentrations ≥ 4%, avoid excessive air filling into the laryngeal mask or a short period of surgical avoidance of the laryngeal mask, these measures will help reduce the risk of loss of taste and smell.

## Conclusion

Simultaneous taste and smell alterations after general anesthesia suggests a drug-induced reaction. The overall evidence suggests that the anesthetic drugs caused the postoperative ageusia and anosmia.

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