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## CASE REPORT

### Transient unilateral lingual nerve injury following the use of laryngeal mask airway Supreme: a case report

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#### KEYWORDS

General anesthesia;  
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**Abstract** Lingual nerve injury rarely occurs after using the laryngeal mask airway (LMA). A 40-year-old woman with no comorbidities visited the hospital for left breast-conserving surgery. Anesthesia was performed using LMA Supreme™. She complained of decreased sensation in the right front part of the tongue postoperatively. She received prednisolone and tongue sensation returned on postoperative day 28. The lingual nerve could be damaged by the LMA, particularly the lateral edge of the tongue base and inner part of the mandible around the third molar. When using the LMA, it is necessary to check the cuff pressure to prevent lingual nerve damage.  
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#### Introduction

If the laryngeal mask airway (LMA) is properly mounted, the tip of the LMA is placed between cervical vertebrae 6 and 7, i.e., the side of the upper esophageal sphincter and lower boundary of the hypopharynx.<sup>1</sup> Although the LMA is associated with several complications, cranial nerve injury rarely occurs. Therefore, determining its incidence rate is difficult. Furthermore, the mechanism of damage is unclear. Here, we report a case of abnormal tongue sensation caused by temporary lingual nerve damage in a patient without any

underlying disease who was administered general anesthesia using an LMA to undergo left breast-conserving surgery.

#### Case report

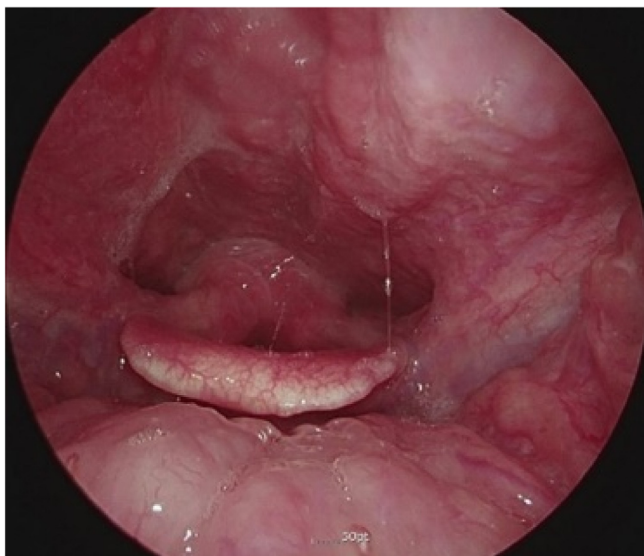
Informed consent to publish the case report was obtained from the patient. The institutional review board of our institute approved this study (IRB#: NCC2021-0037).

A 40-year-old woman (height 163.6 cm and weight 41.5 kg) with no specific medical history was diagnosed with invasive ductal carcinoma in the left breast. She was admitted to our hospital to undergo left breast-conserving surgery with axillary lymph node dissection. No metastasis to bones or other organs was observed on preoperative examination. Blood test, electrocardiography, and chest radiographic findings were normal. At the time of admission to the operating

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**Figure 1** Normal laryngoscopic findings of the patient.

room, her blood pressure was 150/67 mmHg, pulse rate was 103 beats.min<sup>-1</sup>, and percutaneous oxygen saturation was 99%. For anesthesia induction, total intravenous anesthesia was initiated by setting the target concentrations of propofol and remifentanyl to 6 µg.mL<sup>-1</sup> and 3 ng.mL<sup>-1</sup>, respectively, using a target-controlled infusion pump under oxygen inhalation of 6 L.min<sup>-1</sup>. After loss of consciousness and availability of manual bagging, vecuronium 3 mg was intravenously injected. After confirming that the muscle was relaxed, as Train of Four was 0, LMA Supreme™ No. 3 lubricated with normal saline was inserted and mounted without any resistance. After introducing the LMA, both lung sounds and chest movements were symmetrical without any sounds over the epigastrium and no audible leak. In addition, the curve of the end tidal carbon dioxide monitor on the ventilator was normal. There were no specific problems during the surgery, including the patient's blood pressure which was maintained at normal, and the LMA was removed after consciousness and spontaneous breathing returned. No signs of bleeding were noticed in the posterior region of the LMA at the time of removal. The total operative time was 1 h and 20 min and anesthesia time was 2 h and 5 min. There was almost no bleeding during the operation, and the total amount of crystalloid administered was 550 mL.

The patient recovered in the recovery room without any specific problems and was transferred to the general ward. At the time patient arrived to the general ward, there was no problem with tongue movements. However, the patient complained of numbness in the right front part of the tongue in addition to decreased sensation compared with the left part of the tongue. Nevertheless, tongue deviation or vocalization problems were not observed. The patient started eating porridge from the evening of the surgery and there was no problem with taste sensing and food swallowing at that time. On postoperative day 1, the aforementioned symptoms were checked by an otolaryngologist, and laryngoscopy did not reveal any damage to the structures in the oral cavity. Furthermore, there were no problems with larynx movement (Fig. 1).

Otolaryngological examination revealed that loss of sensation was a symptom caused by a temporary right lingual nerve injury, which could be improved. From postoperative day 1, prednisolone 40 mg was administered for 3 days based on the discretion of the doctor in charge; the dose was reduced by half (20 mg → 10 mg → 5 mg → stop) each day.

From postoperative day 2, the tongue sensation of the patient gradually started to return. On postoperative day 4, when the sensation was tested by stimulating the tongue with a toothpick and cotton swab, it was noted that the symptoms had improved. The sensation in the right front half of the tongue was approximately 40% of that in the left front half and felt similar on both sides of the posterior half. On postoperative day 6, the sensation in the one-third part of the right side of the tongue was approximately 60% of that in the left side, and there was no difference in the sensation between the right and left sides in the remaining part of the tongue. On postoperative day 28, all senses of the tongue had returned to normal.

## Discussion

The lingual nerve branches off from the mandibular nerve, goes between the lateral pterygoid muscle and medial pterygoid muscle, and passes around the ramus of the mandible. It passes the inner side of the mandible around the third molar, and at the front, it passes the hypoglossus muscle and arrives at the tongue. Finally, this nerve forms a terminal branch at the bottom of the mucosa of the tongue. This nerve is responsible for sensation in the anterior two-third of the tongue. Around the ramus of the mandible, it meets the chorda tympani nerve, a branch of the facial nerve, which is responsible for taste in the anterior two-third of the tongue.

The lingual nerve could be damaged by LMA. In particular, the lingual nerve is known to be damaged at the lateral edge of the tongue base or inner mandible around the third molar.<sup>1</sup> As the chorda tympani nerve is present on the path of the lingual nerve, damage to the lingual nerve could result in changes in tongue sensation as well as in taste. In case of lingual nerve damage, abnormal tongue sensation occurs at the front of the tongue within a few minutes to at least 24 h after LMA insertion.

Use of nitrous oxide (N<sub>2</sub>O), incorrect placement of LMA, LMA cuff pressure of >60 cmH<sub>2</sub>O, or incorrect size of the LMA can result in lingual nerve damage.<sup>1</sup> Traumatic insertion by not inserting the LMA smoothly, secondary chemical nerve injury using the incorrect lubricant during LMA insertion, long surgical time, strong head turning during surgery, or postural problems, including the prone or lateral position, could also result in lingual nerve damage. Furthermore, patients with diabetes or peripheral vascular disease as an underlying disease may be affected.<sup>1</sup>

For most patients, lingual nerve damage naturally improved without treatment, generally within several hours to around 6 months.<sup>1</sup> Besides, psychotherapy, antidepressants, steroid, and anticonvulsants could be helpful, and nerve block or surgical repair can also be an option.<sup>2</sup>

In the present study, the patient had no underlying disease, her body mass index was 15.5 kg.m<sup>-2</sup>, and N<sub>2</sub>O was not used during anesthesia. Furthermore, tidal volume, peak



**Figure 2** Laryngeal mask airway (LMA) Supreme No. 3. The black arrow indicates the possible region of the LMA responsible for the nerve damage.

inspiratory pressure, and plateau pressure were within normal ranges during surgery, confirming that there was no problem with the LMA placement. During LMA insertion, the LMA was lubricated with normal saline and smoothly inserted to ensure that there was no chemical damage or traumatic insertion. During surgery, the patient was maintained in the supine position, and the surgery duration was not long. Therefore, this temporary lingual nerve damage could have been due to overpressure to the cuff caused by not monitoring cuff pressure (Fig. 2).

Presently, LMA is classified and chosen based on the patient's weight. LMA Supreme™ No. 3, used in this case, is generally used for patients weighing 30–50 kg. The manufacturer recommends the injection of <30 mL of air in the cuff and the maintenance of cuff pressure at <60 cm H<sub>2</sub>O. In our case, 20 mL of air was injected for proper airway seal. According to a study, although N<sub>2</sub>O is not used, the cuff pressure can be higher than the recommended level as

the anesthesia time elapses in three-fourth of the patients.<sup>3</sup> There are reports on nerve injuries caused by LMA ProSeal™ or LMA classic™, which could have ballooned the cuff, like LMA Supreme™ in this case; however, lingual nerve injury has also occurred due to i-gel™, which cannot balloon the cuff.<sup>4</sup> According to Brimacombe et al.,<sup>5</sup> even if the cuff volume suggested by the manufacturer is injected, perfusion decreases in the tissue to which the cuff touches, resulting in nerve or tissue damage. Therefore, even if the suggested cuff volume is well maintained, it is necessary to check the cuff pressure.

In conclusion, when considering this case to prevent lingual nerve damage during anesthesia, if LMA that can control the cuff volume is used, the cuff pressure needs to be checked using a manometer immediately after LMA insertion. Furthermore, additional checking is necessary in case of long surgeries. Although the incidence rate of lingual nerve injury is very low and usually is improved without leaving any complications, the most important thing to prevent injuries caused by anesthesia is to use the LMA correctly.

## Conflicts of interest

The authors declare no conflicts of interest.

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