



Numbness of the lower lip following urological surgery under general anesthesia - A case report -

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Background: Peripheral nerve injury is a complication that can occur after general anesthesia. It significantly impairs the patient's quality of life and may lead to permanent disability. Nerves in several areas can be damaged during the perioperative period, but it is very rare that numbness of the lower lip is caused after general anesthesia.

Case: A 73-year-old man with diabetes mellitus underwent urological surgery under general anesthesia. The day after surgery, he complained of numbness on the right lower lip caused by a mental nerve injury. Diabetic mononeuropathy or neurapraxia related to mechanical compression was considered a possible cause. The symptoms resolved spontaneously after six weeks.

Conclusions: Mental nerve injury is a rare perioperative complication in surgical patients under general anesthesia. In this case, patients should be reassured and advised to avoid injuries to the mouth and lips. However, specific treatment is not required.

Keywords: Anesthesia, general; Mononeuropathies; Peripheral nerve injury; Postoperative complications.

Peripheral nerve damage as an anesthetic complication is caused by compression or stretching of the local nerve and usually improves within 6–8 weeks. However, in some cases, it can be a permanent damage. According to the ASA closed-claims project review, nerve damage accounts for approximately 22% of the serious complications that occur after general anesthesia [1]; therefore, it is important to prevent peripheral nerve damage during anesthesia.

Perioperative peripheral nerve damage mainly occurs in the brachial plexus, ulnar nerve, and common peroneal nerve. Other nerves, such as the facial nerve or lingual nerve, can also be damaged [2].

Mental nerve injury may also occur perioperatively, but it is mainly associated with dental surgery [3]. However, it rarely occurs after general anesthesia, and there are few

case reports on this.

The authors experienced a case of mental nerve injury with loss of sensation in the lower lip after general anesthesia. Here, we report the case with a review of related literature.

CASE REPORT

Written informed consent was obtained from the patient for the publication of this case.

A 73-year-old patient with a height of 162.1 cm and weight of 71.4 kg was admitted to the hospital for scheduled transurethral resection of bladder tumor and the prostate (TURBT and TURP) for the treatment of bladder cancer and benign prostate hyperplasia. The patient had been taking met-

formin and rosuvastatin for type 2 diabetes mellitus and hyperlipidemia, respectively. In preoperative testing, blood glucose levels measured at fasting and 2 h postprandial were 142 mg/dl and 257 mg/dl, respectively. HbA1c was 8.3%. The patient did not have any complications. Other preoperative screening test results were within normal limits. He underwent TUR-BT and TURP under general anesthesia.

General anesthesia was induced by intravenous administration of propofol (90 mg). The patient was ventilated with a bag and mask using oxygen and desflurane. Rocuronium 50 mg was injected intravenously to block the neuromuscular junction. Manual ventilation using a bag and mask was easy, and there was no excessive compression on the patient's face. Four minutes after the rocuronium injection, the patient was intubated using a video laryngoscope and 7.5 mm cuffed endotracheal tube. After confirming that the breath sounds could be auscultated symmetrically in both lung fields, the endotracheal tube was fixed at a depth of 23 cm at the right corner of the patient's mouth. Anesthesia was maintained with desflurane and remifentanyl. Entropy was maintained within the range of 40–60 during the surgery. The surgery lasted for 75 min uneventfully. Intraoperative blood glucose level was 110 mg/dl. At the end of the surgery, the train-of-four (TOF) count was measured as 0. Neuromuscular blockade was reversed with the intravenous administration of 200 mg of sugammadex. The patient was extubated after the anesthesia provider confirmed that the TOF ratio was 100%. The patient was transferred to the postanesthetic care unit and was shifted to the general ward after full recovery from anesthesia.

On the following day, the patient complained of numbness of the lower lip, and a consultation was requested to the anesthesia department on postoperative day 2. When we visited the patient, the sensation of touch, temperature, and pain in the left lower lip were intact, but he complained of mild hypoesthesia of touch on the right lower lip. There was no abnormality in the motor function of the lip. In the results of a neurological consultation on postoperative day 4, it was mentioned that the symptom could be related to mononeuropathy due to underlying diabetes mellitus. Since there were no other neurologic symptoms and because mental nerve injury is difficult to diagnose with general neuromuscular tests, the neurologist suggested close observation. The patient was discharged on postoperative day 7 after confirming that he had no difficulties in daily life, such as eating or speaking. The symptoms re-

solved spontaneously after 6 weeks.

DISCUSSION

In this case, the patient experienced numbness of the right lower lip without drooling or paralysis of the tongue. These symptoms indicate a mental nerve injury. The mental nerve is the mandibular division of the trigeminal nerve (cranial nerve V), which innervates the anterior part of the jaw, lower lip, labial gingivae, and premolars. This nerve starts from the mental foramen of the mandible and is divided into a branch leading to the jaw and two further branches distributed in the skin and mucous membrane of the lower lip. Among symptoms of mental nerve paresthesia, paralysis of the tongue and numbness of the lips are the most common, and can be accompanied by loss of taste, dysphasia, or drooling [4].

Although it is not clear why mental nerve injury occurred after general anesthesia, compression of the mental nerve during mask ventilation could be a cause. Compression can lead to mechanical deformity or ischemic injury of the nerve. Cases of mental nerve injury followed by extended face mask time of more than 30 min [5], a tight seal of mask due to difficult airway [6], or compression of adjuvant tissue by oropharyngeal airway [7] support this hypothesis. However, in our case, the patient was easily ventilated, and there was no excessive pressure on the face during mask ventilation.

The mental nerve could be compressed by the tape used to fix the endotracheal tube around the patient's lips. We used a tape to fix an endotracheal tube in the right corner of the patient's mouth, and the tape could have been tightly fixed (Fig. 1).

In prior cases reported, patients did not have any underlying disease [5–7]; however, in this case, the patient was diabetic. Diabetes mellitus is known to be a risk factor for peripheral nerve injury, along with hypertension and smoking history [8]. It can cause chronic neuropathy and is reported to be a potential cause of peripheral nerve injury [9]. Although there is no significant association between underlying diabetes mellitus and peripheral nerve injury after total knee arthroplasty [10], it is a risk factor for ulnar neuropathy after surgery [11]. Therefore, the patient in this case may also be considered vulnerable to peripheral nerve injury.

Neuropathy caused by diabetes mellitus can occur in various lesions. In particular, mononeuropathy is often



Fig. 1. Fixed tape course and mental nerve pathway. This illustration presents the course of tapes for the fixation of the endotracheal tube. Mental nerve pathway is shown as a yellow line.

known to affect the median, radial, or lateral popliteal nerves, but it may occur in other nerves, such as the cranial nerves [12]. Neuropathy is a relatively common complication of diabetes mellitus, with an approximate incidence of 30% [13]. The causes of perioperative peripheral nerve injury must be differentiated from the intraoperative positioning of a patient and underlying diseases, such as diabetes mellitus, hypothyroidism, and muscle disease [2], leaving the possibility of neuropathy caused by underlying diabetes mellitus in our case. Moreover, our patient's HbA1c level was quite high at 8.3%. Hyperglycemia, alcohol consumption, cigarette smoking, and hypertension are known to be risk factors for diabetic neuropathy [12], while Booya et al. [14] reported that hyperglycemia is the only risk factor that can be modified for diabetic neuropathy. This explains the possibility that the patient in our case was more susceptible to diabetic neuropathy. Moreover, focal diabetic neuropathy tends to occur in elderly patients [15], similar to the patient in our case.

Most patients with mental nerve injury after general anesthesia usually experience numbness of their lower lip on the day after the surgery. Half of the patients had complaints of inconvenience in daily life, such as drooling from the mouth. However, no specific treatment was required in these cases and they completely recovered within 2 to 6 weeks [5–7]. In our case, the numbness of the lower lip resolved spontaneously after 6 weeks.

If diabetic neuropathy is suspected, although mononeuropathy is usually self-limiting [15], drugs such as anticonvulsants or antidepressants can be used to reduce symptoms [13]. Hyperglycemia is a risk factor for diabetic neuropathy, and strict glucose control is an effective treatment and prevention strategy, leading to a 60% reduction in the risk of diabetic neuropathy [12]. Anesthesiologists should discuss with surgeons about controlling glucose levels in diabetic patients in the preoperative period. It is desirable to minimize preoperative glycemic variability in order to reduce the possibility of diabetic neuropathy as well as other complications [15].

Most of the mechanical damage to the nerves is caused by external pressure or stretching. To prevent mental nerve injury, anesthesiologists should be cautious not to excessively compress the patient's face. However, mental nerve injury can occur without special events, as in the case reported by the authors. Therefore, informed consent may be needed regarding the risk of neuropathy. In addition, tight glycemic control and reduction of glycemic variability may be needed in diabetic patients. As patients with mental nerve injury spontaneously recover in most cases, they should be reassured and advised to be careful and avoid additional injuries to the mouth and lips.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

DATA AVAILABILITY STATEMENT

All data generated or analyzed during this study are included in this published article. This is a case report.

AUTHOR CONTRIBUTIONS

Writing - original draft: Su Yeon Kim. Writing - review & editing: Yunhee Lim, Geon Hyeong Bae, Dae Hee Suh, Kye-Min Kim. Supervision: Yunhee Lim, Kye-Min Kim.

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REFERENCES

1. Metzner J, Posner KL, Lam MS, Domino KB. Closed claims' analysis. *Best Pract Res Clin Anaesthesiol* 2011; 25: 263-76.
2. Hewson DW, Bedforth NM, Hardman JG. Peripheral nerve injury arising in anaesthesia practice. *Anaesthesia* 2018; 73 Suppl 1: 51-60.
3. Batbold D, Kobayashi A, Kumagai J, Yamaguchi S, Yoda T. Clinical observation of patients with inferior alveolar nerve sensory disturbance. *J Oral Sci* 2020; 62: 112-8.
4. Ahmad M. The anatomical nature of dental paresthesia: a quick review. *Open Dent J* 2018; 12: 155-9.
5. Bhuiyan MS, Chapman M. Mental nerve injury following face-mask anaesthesia. *Anaesthesia* 2006; 61: 516-7.
6. Lorentz A, Podstawski H, Osswald PM. [Numbness of the lower lip following general anaesthesia]. *Anaesthesist* 1988; 37: 381-3. German.
7. Gimmon Z. Neuropraxia of the mental nerve. *Anaesthesia* 1988; 43: 613.
8. Welch MB, Brummett CM, Welch TD, Tremper KK, Shanks AM, Guglani P, et al. Perioperative peripheral nerve injuries: a retrospective study of 380,680 cases during a 10-year period at a single institution. *Anesthesiology* 2009; 111: 490-7.
9. Jones HD. Ulnar nerve damage following general anaesthetic. A case possibly related to diabetes mellitus. *Anaesthesia* 1967; 22: 471-5.
10. Horlocker TT, Hebl JR, Gali B, Jankowski CJ, Burkle CM, Berry DJ, et al. Anesthetic, patient, and surgical risk factors for neurologic complications after prolonged total tourniquet time during total knee arthroplasty. *Anesth Analg* 2006; 102: 950-5.
11. Warner MA, Warner ME, Martin JT. Ulnar neuropathy. Incidence, outcome, and risk factors in sedated or anesthetized patients. *Anesthesiology* 1994; 81: 1332-40.
12. Aring AM, Jones DE, Falko JM. Evaluation and prevention of diabetic neuropathy. *Am Fam Physician* 2005; 71: 2123-8.
13. Callaghan BC, Cheng HT, Stables CL, Smith AL, Feldman EL. Diabetic neuropathy: clinical manifestations and current treatments. *Lancet Neurol* 2012; 11: 521-34.
14. Booya F, Bandarian F, Larijani B, Pajouhi M, Nooraei M, Lotfi J. Potential risk factors for diabetic neuropathy: a case control study. *BMC Neurol* 2005; 5: 24.
15. Edwards JL, Vincent AM, Cheng HT, Feldman EL. Diabetic neuropathy: mechanisms to management. *Pharmacol Ther* 2008; 120: 1-34.