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Bilateral Anesthesia Mumps After Robot-Assisted Hysterectomy Under General Anesthesia: Two Case Reports

Jung Min Lee, Eun Young Park, Kyung Mi Kim, Jong Chan Won, You Jung Kim, Soo Kyung Lee*

Department of Anesthesiology and Pain Medicine, Hallym University Sacred Heart Hospital, College of Medicine, Hallym University, Anyang, Republic of Korea

Email address:

agneta@hallym.or.kr (S. K. Lee)

*Corresponding author

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Abstract: Acute post-operative parotid gland swelling or "anesthesia mumps" is a rare complication that occurs after general or regional anesthesia. While the exact mechanism underlying this condition is not fully understood, mechanical obstruction of Stensen's duct due to incorrect head positioning, peri-operative medication, dehydration, and retrograde passage of air into the parotid gland have all been implicated in post-operative parotid swelling. Here we present two cases of parotid swelling after robot-assisted hysterectomy, both of which are thought to have been caused by compression due to shoulder braces. Careful attention to the head and neck position is required to avoid mechanical obstruction of the parotid duct, and by extension, parotid gland swelling.

Keywords: Anesthesia Mumps, Robot-Assisted Hysterectomy, Trendelenburg Position, Parotitis

1. Background

Anesthesia mumps refers to a rare post-operative acute parotid gland swelling that usually resolves within a few days [1-3]. The first report of anesthesia mumps was by Attas in 1969 [4], and many subsequent cases have been reported during thyroidectomy, spinal surgery, plastic surgery, gynecological surgery, neurosurgery, thoracotomy and nephrectomy [3, 5-11]. However, the etiology of anesthesia mumps remains unknown, although conditions causing salivary duct stasis may be responsible [12]. Here we present two cases of bilateral anesthesia mumps after robot-assisted hysterectomy (conducted under general anesthesia) in patients with no predisposing history.

2. Case Report

Case 1

A 51-year-old female patient (height, 160 cm; weight, 63 kg; body mass index [BMI], 24.6) was scheduled for robot-assisted hysterectomy under general anesthesia. She had no medical history and the results of pre-operative biochemical studies, chest X-ray, and electrocardiography (ECG) were normal. The American Society of Anesthesiologists Physical Status (ASA PS) score was I. The patient was pre-medicated with 0.2 mg intramuscular glycopyrrolate. On arrival in the operating room, intraoperative monitoring was done including non-invasive blood pressure, ECG, pulse oximetry, bispectral index and end-tidal carbon dioxide. Her vital signs were as follows: blood pressure, 185/95 mmHg; heart rate, 69 beats/min; and oxygen saturation, 97%. General anesthesia was induced with 20 mg intravenous lidocaine, 80 mg propofol, 40 mg rocuronium, and continuous infusion of remifentanil. Mask ventilation was performed for 3 min with the ventilation pressure maintained under 20 cmH_2O. After tracheal intubation, anesthesia was maintained with 2.0-2.5 vol% sevoflurane (fraction of inspired oxygen, 0.5). The patient was placed in the lithotomy position with arms by the side. Shoulder braces were applied to both shoulders to prevent the patient from sliding (Figure. 1). The surgery was

about 90 min in duration, and was conducted with the patient in the steep Trendelenburg position. A total of 1 mg intravenous neostigmine and 0.2 mg glycopyrrolate were administered to reverse muscle relaxation at the end of surgery. After the patient was extubated, she was transferred to the post-anesthesia care unit (PACU) and observed for 30 min, during which time no problems were noted. About 10 h after being moved to the general ward, the patient complained of swelling in the both post-auricular region, as well as fever (up to 38.1°C) and pain (visual analogue scale [VAS] score of 4). The swelling extended to the neck region and she also complained of dyspnea upon lying down. The patient was referred to an otolaryngologist for pharyngeal injection, and showed arytenoid and parotid swelling on laryngoscopic examination. Contrast-enhanced computed tomography of the neck revealed cellulitis in the submandibular space, and the parotid gland was enlarged and enhanced (Figure. 2). The patient received intravenous propacetamol and antibiotics (ampicillin and sulbactam). The symptoms subsided within 24 h and the patient was discharged on post-operative day 6 without any problems.

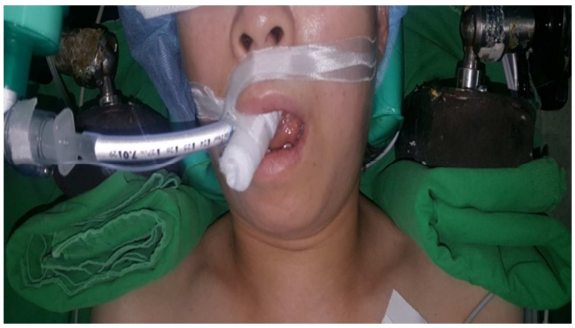

Figure 1. *Shoulder braces applied to both shoulders to prevent the patient from sliding.*

Figure 2. *Axial contrast-enhanced CT demonstrating enlargement of both parotid glands and submandibular space.*

Case 2

A 48-year-old female patient (height, 151 cm; weight, 52 kg; BMI, 22.9) was scheduled for robot-assisted hysterectomy under general anesthesia. No specific problems were apparent in her medical history or on pre-operative studies. The ASA PS score was I. The patient was pre-medicated with 0.2 mg intramuscular glycopyrrolate. After arriving in the operating room, the intraoperative monitoring including non-invasive blood pressure, ECG, pulse oximetry, bispectral index and end-tidal carbon dioxide were applied. Her vital signs in the operating room were as follows: blood pressure, 126/65 mmHg; heart rate, 75 beats/min; and oxygen saturation, 97%. General anesthesia was induced with the same anesthetics used in Case 1 (20 mg intravenous lidocaine, 80 mg propofol, 30 mg rocuronium, and continuous infusion of remifentanil). Mask ventilation was also performed for 3 min and tracheal intubation was done. The anesthesia was maintained with 2.0-2.5 vol% sevoflurane and continuous infusion of remifentanil. She was placed in the lithotomy and Trendelenburg positions with arms by the side. Following the 80 min surgery, 2 mg intravenous neostigmine and 0.4 mg glycopyrrolate were administered to reverse muscle relaxation. The patient was extubated and stayed in the PACU for 30 min, during which time no problems were noted. The patient complained of swelling in both submandibular areas and had a pain VAS score of 2 about 10 h after being moved to the general ward. She was also treated with intravenous propacetamol and antibiotics (ampicillin and sulbactam). The swelling resolved spontaneously after 3 days and the patient was discharged on post-operative day 5.

3. Discussion

Acute parotid gland swelling or “anesthesia mumps” is a rare peri- or post-operative condition that has been reported in several studies [3, 5-11]. The exact mechanism underlying the development of anesthesia mumps is not clear, but there are several hypotheses: theoretically, in conditions causing salivary stasis, secondary salivary infection could occur due to mechanical obstruction of the salivary duct; a medical condition, such as diabetes mellitus, hepatic failure, renal failure, hypothyroidism, Sjögren’s syndrome, depression or malnutrition could underlie development of anesthesia mumps; the use of perioperative medications, such as anticholinergic agents, could cause this condition; or it could result from dehydration. The most common pathogen involved in anesthesia mumps is gram-positive bacteria [12].

Head position during operation plays a role in parotid gland swelling. Berker *et al*. [13] reported five cases of acute parotitis after neurosurgical procedures; all of the patients were placed in the sitting position, with mild flexion and rotation of head, during 4–6 h of surgery, and the authors suggested that these conditions might have influenced the drainage of Stensen’s duct and caused an obstruction in the parotid gland. Liu *et al*. [3] reported that in two patients placed in the prone position, swelling developed in the side of the face in contact with a pad after 5–6 h of spinal surgery. In several other reports, patients were placed in the lateral decubitus position (e.g., for nephrectomy and thoracotomy) [10, 11]. In these studies, it was concluded that obstructive

parotitis developed due to direct compression of the parotid gland.

Another theory posits that parotid gland swelling might represent a form of pneumoparotid. Straining or coughing during or after anesthesia may increase positive pressure in the oral cavity. Furthermore, peri-operative dehydration and use of muscle relaxants (succinylcholine) or anticholinergics (glycopyrrolate) increase the risk of a loss of muscle tone around Stensens' duct, which can in turn result in retrograde passage of air into the parotid gland [2, 5, 8].

It is also possible that the parasympathetic stimulation (i.e., the pharyngeal reflex) associated with endotracheal intubation results in vasodilation and hyperemia in the parotid gland [2]. Anesthesia mumps have also been reported in patients requiring high-dose vasopressor treatment (ephedrine or epinephrine) after regional anesthesia [14]. The authors hypothesized that the mumps were caused by the beta-stimulating effects of the vasopressors. Both sympathetic and parasympathetic stimulation appear to affect glandular secretions and blood supply, and can cause bilateral parotid gland swelling.

Because diagnostic imaging studies are non-specific, mild hyperenhancement of the parotid gland on contrast-enhanced computed tomography would be useful for diagnosis of anesthesia mumps [15]. Ultrasonography can reveal hyperechoic masses with subcutaneous emphysema [3]. In most of these cases, no treatment is needed other than reassurance and adequate hydration or antibiotics, as parotid swelling is self-limited and subsides after a few days. However, there have also been cases of life-threatening sialadenitis causing massive facial edema and complete airway obstruction [9], so careful airway examination should be performed in patients with a rapidly developing parotid swelling.

In our cases, anesthesia mumps might have been caused by the shoulder braces applied to prevent the patients from sliding while in the steep Trendelenburg position. We did not suspect dehydration as the cause of salivary stasis as the total anesthesia time of the two patients was less than 150 min and intraoperative hydration was adequate. Instead, we suggest that the hard shoulder braces were too close to the patients' faces and necks, and thus compressed their salivary ducts, in turn inducing salivary stasis as there was no predisposing medical history in either case. The patients spent about 90 min in the Trendelenburg position, and these cases suggest that anesthesia mumps due to salivary stasis could form even during relatively short-duration surgery.

4. Conclusion

Acute parotid swelling is a rare complication after general or regional anesthesia, but may occur in conditions causing salivary stasis. Adequate hydration, use of appropriate medication in at-risk patients, and careful attention to the head and neck position (to avoid mechanical obstruction of the parotid duct) may help to prevent this complication.

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