

Right hypoglossal nerve paralysis after tracheal intubation for aesthetic breast surgery

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ABSTRACT

Aesthetic and functional complications caused by general anesthesia have been rarely described after aesthetic surgery. We report a case of unilateral right hypoglossal nerve paralysis following the use of a cuffed endotracheal airway in a 24-year-old woman undergoing aesthetic breast surgery. Neurological examination and magnetic resonance imaging of the head failed to provide additional insights into the cause of the nerve injury. Postoperatively, the patient was carefully monitored and made a full recovery within 2 weeks without any pharmacological treatment. The transient hypoglossal nerve paralysis seemed to be due to neuropraxia. In this patient, we postulate that the right hypoglossal nerve was compressed between the endotracheal tube cuff and the hyoid bone, which was inflated with 30 cm H₂O. Patients undergoing aesthetic surgery must be appropriately and adequately informed that postoperative aesthetic and functional deficits can occur due to anesthesia as well as the surgery.

Key words: Aesthetic surgery, hypoglossal nerve palsy, intubation anesthesia, postoperative complications

INTRODUCTION

Unilateral hypoglossal nerve palsy has been rarely described after endotracheal intubation. Michel and Brusis described unilateral hypoglossal nerve palsy after tonsillectomy.^[1] Agnoli and Strauss reported four cases of hypoglossal nerve palsy following intubation and direct laryngoscopy.^[2] Kaess described transitory hypoglossal paralysis following bronchoscopy. Konrad and Lakomy described peripheral hypoglossal paralysis after intubation anesthesia for surgery of the aortic isthmus.^[3,4] Further case reports of hypoglossal nerve palsies have been reported by Nagai *et al.* after laryngeal mask airway, Gatot *et al.* after infected second branchial arch cleft cysts, and Stankiewicz and Pazevic after tooth extraction.^[5-7] We describe a patient with isolated unilateral hypoglossal nerve paralysis after uneventful tracheal intubation for aesthetic breast surgery.

CASE REPORT

A 24-year-old female Caucasian patient, 171 cm tall and weighing 60 kg, was to undergo bilateral breast augmentation, exchange of implants, and mammoplasty for bilateral breast ptosis and capsular contracture. Past medical history included bilateral breast augmentation in 2008 and abdominoplasty in 2007 after 90 kg weight loss, lower Cesarean section in 2004, and tonsillectomy as a child. She was otherwise well and did not take any regular medication. The pre-operative physical examination showed good neck extension and mouth opening, and a straightforward endotracheal intubation was anticipated. Two hours before the induction of anesthesia, she received chlorazepam 20 mg orally as premedication. General anesthesia was induced with fentanyl 0.1 mg and 200 mg propofol, and atracurium 25 mg was used to prevent laryngospasm during insertion of the endotracheal tube. At intubation, the Cormack and Lehane grade was described as 1, using a standard size 3 Macintosh blade. A 7.5-mm Magill tube was used. After intubation, proper placement of the endotracheal tube was confirmed by bilateral breath sounds. The endotracheal tube cuff was inflated with air until the cuff pressure was 30 cm H₂O. During surgery, the patient received intermittent positive pressure ventilation with 67% nitrous oxide in oxygen, 0.8-1.2% isoflurane, supplemented with fentanyl 0.15 mg.

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The maximum endotracheal tube cuff pressure did not exceed 34 cm H₂O. The patient was placed in a 30° elevated supine position and the head was supported in position with a donut-type pillow. Surgery was completed uneventfully within 90 min, blood loss was minimal, and fluid replacement was done with 1000 ml of full electrolyte solution Jonosteril (Fresenius, Bad Homburg, Germany) and 500 ml of conventional 6% hetastarch 130/0.4 (Tetraspan, B. Braun, Melsungen, Germany). No significant changes in cardiovascular or respiratory parameters occurred during the operation. When spontaneous respiration and muscle tone were considered to be adequate, the endotracheal tube was carefully removed and transferred to the recovery unit. After 35 min, the patient was discharged to the ward.

The next morning, she complained of slight difficulty in swallowing solid foods but was able to drink water. On clinical examination, her tongue deviated to the right on protrusion and she was unable to move it to the left; there were no further detectable cranial nerve abnormalities. Magnetic resonance imaging of her brain did not demonstrate any evidence of an ischemic event or focal abnormality. A neurologist diagnosed an isolated paralysis of the right hypoglossal nerve. The neurologist recommended supportive treatment and did not prescribe any pharmacological therapy. Two weeks post surgery, the patient attended the neurology out-patient clinic; at this time, she had complete resolution of symptoms and had made a complete recovery.

DISCUSSION

Hypoglossal nerve palsy has been reported as a result of both idiopathic^[8] and iatrogenic trauma.^[9] It has been reported, both in isolation^[10] and in conjunction with neuropraxia of the lingual nerve subsequent to diagnostic and therapeutic surgical procedures such as tonsillectomy,^[11-13] direct laryngoscopy,^[2,14] posterior third of tongue operations,^[15] and bronchoscopy.^[3,16] Pertinently, it has also been described subsequent to both laryngeal mask^[5,17,18] and endotracheal anesthesia.^[19] Non-iatrogenic traumatic injury to the hypoglossal nerve has been described in association with fractures of the occipital bone in relation to the hypoglossal foramen,^[20] and in neck hyperextension,^[21-23] infection with Epstein Barr virus,^[24] vaccination against influenza virus,^[25] carotid artery aneurysms,^[26] hematomata,^[27] intracranial tumors and their treatment by radiotherapy,^[28] and in patients suffering from Horner's syndrome.^[29] Infection of branchial cleft cysts resulting in compression of the hypoglossal nerve with subsequent nerve weakness has also been previously described.^[6] Hypoglossal nerve palsy has been reported subsequent to dental extraction under both local^[7] and general anesthesia.^[6,30] Lingual nerve injury,

on one occasion in combination with hypoglossal nerve damage, has been reported as a result of compression from the blade of a laryngoscope at the root of the tongue.^[31-35]

Possible mechanisms of injury in this case, therefore, include indirect trauma (from positioning/stretching of the neck) or direct trauma (laryngoscopy, bronchoscopy, or from continuous pressure of laryngeal mask airways). In this case, intubation was uneventful and the head was supported in a neutral position for the length of the operation with a donut-type pillow.

Thus, the injury must have been caused by some other mechanism, the nature of which can only be elucidated by considering the pathway of the hypoglossal nerve. It originates from the hypoglossal nerve nucleus in the medulla, leaves the cranium through the hypoglossal canal, and descends between the internal jugular vein and the internal carotid artery, deep to the posterior belly of digastric. The nerve then continues anterior and superior to the greater cornu of the hyoid bone and enters the floor of the mouth deep to the posterior margin of the myohyoid muscle, supplying motor innervation to both intrinsic and extrinsic lingual muscles.^[36]

In this patient, we postulate that the right hypoglossal nerve was compressed between the endotracheal tube cuff and the hyoid bone, which was inflated with 30 cm H₂O. Thus, extreme care should be taken to prevent nerve injuries and other complications during the use of the endotracheal tube.

Dysarthria and dysphagia as a result of hypoglossal nerve palsy tend to be distressing for the patient. The treatment of hypoglossal nerve palsy is supportive with fluid replacement.^[37] In addition, empirical courses of systemic steroids and/or vitamin B12 have been used for treatment.^[37] Hypoglossal nerve imaging is recommended, if there is any suspicion of a central cause or base of skull fracture.^[38] Damage to the hypoglossal nerve is a rare complication of general anesthesia, which has been reported to be associated with procedures utilizing both laryngeal mask and endotracheal airways. Patients undergoing aesthetic surgery must be appropriately and adequately informed that postoperative aesthetic and functional deficits can occur due to anesthesia as well as surgery.^[39-43]

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