Transient Lingual and Hypoglossal Nerve Damage After Rotator Cuff Repair

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Abstract

When providing anesthesia for patients in the sitting position, important considerations must be made regarding patient positioning in order to avoid nerve injuries. Damage to both the lingual and hypoglossal nerves can occur from an overinflated endotracheal tube cuff, hyperextension of the head and neck, or from direct laryngoscopy alone. A thorough understanding of the anatomy of both these nerves is crucial to identifying potential causes of nerve damage. The following case report involves a patient who underwent a rotator cuff repair in the sitting position and developed numbness and deviation of the tongue on postoperative day one. This case report highlights the importance of understanding all factors that can contribute to compression of the hypoglossal and lingual nerve and what steps can be taken to best prevent nerve injuries from occurring. Careful and atraumatic laryngoscopy, monitoring of endotracheal cuff pressure, and proper patient positioning are all important steps to take to prevent lingual and hypoglossal nerve damage.
Keywords: Lingual nerve, hypoglossal nerve, sitting position, endotracheal tube, shoulder surgery

Hypoglossal and lingual nerve injuries are rare but well-known complications of direct laryngoscopy and endotracheal intubation. Several case reports have also demonstrated these types of nerve injuries occurring in surgical cases involving the sitting position due to changes in head position.\textsuperscript{1,2} Also, the anatomical locations of both the lingual and hypoglossal nerves near the hypoglossal and mylohyoid muscles place them nearby the endotracheal tube and cuff, where cuff pressures can cause nerve compression and damage.\textsuperscript{2} The following case report describes lingual and hypoglossal nerve damage following a rotator cuff repair surgery in the sitting position.

Case Report

The case involved a 76-year-old 90 kg male who presented for a right rotator cuff repair. His past surgical surgery included multiple knee arthroscopies, umbilical hernia repair, and bilateral shoulder arthroscopies. The patient reported no prior anesthetic complications. Past medical history included non-insulin dependent diabetes mellitus, hypertension controlled with oral medications and occasional heartburn. Medications included metformin, metoprolol, ranitidine, aspirin, and
ibuprofen. Preoperative assessment of the patient revealed a Mallampati II airway and no neurologic deficits of the tongue. No significant findings were reported in the pre-anesthetic evaluation of this patient.

The patient received an 18-gauge peripheral intravenous (IV) catheter and midazolam 2 mg was administered in same-day surgery prior to arriving in the operating room. In the operating room general anesthesia was induced with propofol 150 mg, lidocaine 50 mg, fentanyl 100 mcg, and rocuronium 50 mg. An atraumatic oral endotracheal intubation was then performed using a Macintosh No.3 blade and a 7.5 cuffed endotracheal tube. A grade I view of the cords was obtained, intubation was accomplished in one attempt, and no resistance to endotracheal tube placement was noted. Bilateral breath sounds, positive end-tidal carbon dioxide, and bilateral chest rise were noted immediately following intubation. The endotracheal tube was then secured on the left side of the mouth and taped in place for the duration of the case.

The patient was then placed in the sitting position with padded head and chin support. The patient’s head and neck were in a neutral position, and bilateral breath sounds were auscultated immediately after the patient was placed in the proper sitting position. The patient’s head and neck alignment and endotracheal tube position were checked at frequent intervals throughout the surgical procedure. General anesthesia was maintained during the case with sevoflurane at 1.2 minimum alveolar concentration (MAC) and administration of an additional fentanyl 200 mcg and hydromorphone 2 mg. The patient remained normotensive throughout the procedure and no anesthesia complications were noted. At the end
of the procedure, the patient was extubated awake after exhibiting adequate tidal volumes and respiratory rate. The patient was taken to the post-anesthesia care unit for recovery, then spent another hour in same-day surgery prior to discharge to home.

The day after surgery, the patient contacted the orthopedic surgeon who performed the procedure to report a numb tongue and mild difficulty when swallowing food. The patient was referred to an ear, nose, and throat (ENT) surgeon for further evaluation.

Upon consultation with the ENT surgeon, the patient’s tongue was slightly swollen and deviated to the left side with no lesions or bruising present. These findings in conjunction with the patient’s report of a numb tongue demonstrated that damage to both the hypoglossal and lingual nerve had occurred during surgery. The exact cause of nerve injury was unknown but contributing factors may have been head and neck position during surgery or endotracheal tube position within the oropharynx.

Discussion

Although rare, both hypoglossal and lingual nerve damage following various types of surgical procedures have reported in current literature. Evers et al, in 1999, illustrated a case of lingual and hypoglossal nerve injury for a trans-sphenoidal hypophysectomy in a patient with acromegaly. The authors noted that lingual nerve compression could occur during direct laryngoscopy even when
laryngoscopy occurs in an atraumatic fashion. Damage to both the hypoglossal and lingual nerve can also occur due to hyperextension of the head and neck, which in this case, could have occurred while placing the patient in the sitting position. Since the hypoglossal nerve rests on the anterior surface of the C1 transverse process, hyperextension of this joint could cause excessive stretching and compression of the nerve. In our patient, the head and chin were kept well padded and the head and neck were maintained in neutral alignment with no positional changes noted during the case. The patient was also moved slowly and safely into the sitting position with the help of multiple OR staff members.

Other proposed mechanisms of lingual and hypoglossal nerve injury include excessive endotracheal tube cuff pressures, pressure on the lateral roots of the tongue during direct laryngoscopy or compression of the nerves against the angle of the mandible following changes in patient position. In this case, intubation was accomplished swiftly in one attempt and no trauma was noted during laryngoscopy.

When considering potential causes of the patients lingual and hypoglossal nerve damage from this case, it is important to remember the anatomical position of both of these nerves. The hypoglossal nerve originates in the medulla oblongata and leaves the skull via the hypoglossal canal before descending between the internal carotid artery and the internal jugular vein. The nerve then continues both anterior and superior to the greater cornu of the hyoid bone and enters the bottom of the mouth below the mylohyoid muscle. The lingual nerve branches from the mandibular nerve and thus enters the submandibular region between the superior
constrictor muscle of the pharynx and the styloglossus muscle. The lingual nerve then continues onto the lateral surface of the hyoglossus muscle.\(^5\) (Figure).

**Figure.** Anatomical location and motor/sensory innervation of the hypoglossal and lingual nerves shown.\(^6\)

Since the endotracheal tube was moved to the left side of the patient’s mouth for the procedure and the nerve damage appeared to have occurred on the left side
of the patient’s mouth, the ENT surgeon proposed that the position of the endotracheal tube might have caused nerve compression during the 2-hour surgical procedure. Specifically, the pressure from the endotracheal tube cuff could have led to compression of the nerves between the cuff and the hyoid bone.

The patient reported that his tongue was no longer numb 1 week after the surgical procedure and that 2 weeks post-op he was no longer experiencing difficulties in swallowing. Follow-up with the ENT surgeon 6 weeks after surgery revealed that the left-sided swelling of the tongue had resolved and that the tongue was now midline with no left-sided deviation present.

This case highlights the importance of checking endotracheal tube position as well as patient head and neck position while in the sitting position. Endotracheal tube cuff pressure should also be checked on a routine basis, although the anatomical location of the lingual and hypoglossal nerves make it difficult to keep an inflated endotracheal tube cuff completely free of these structures. Although most cases of lingual and hypoglossal nerve damage are self-limiting, long-term damage can occur.4 Anesthesia providers should be particularly aware of the potential for lingual and hypoglossal nerve damage for all surgeries performed in the sitting position and maintain constant vigilance throughout each case to best prevent these injuries from occurring.
References


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