



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Ipsilateral hypoglossal nerve palsy following left hemithyroidectomy: Case report and review of literature

Mohammed Bu Bshait^{a,*}, Hassan Alyami^b, Emad Al-Osail^b, Haytham Al Arfaj^a

^a Department of Surgery, King Faisal University, Saudi Arabia

^b King Fahad Military Medical Complex Dharan, Saudi Arabia

ARTICLE INFO

Article history:

Received 17 July 2018

Accepted 30 July 2018

Available online 11 August 2018

Keywords:

Hypoglossal nerve palsy

Left hemithyroidectomy

Case report

ABSTRACT

INTRODUCTION: Hypoglossal nerve palsy (HNP) is a rare complication of airway management. Multiple factors have been postulated to contribute to its occurrence. Herein, we present a case of ipsilateral HNP following left hemithyroidectomy.

CASE PRESENTATION: A 47-year-old woman presented complaining of left thyroid swelling for 1 year with no symptoms of compression or hormonal impairment. Ultrasound of the neck showed a 3 × 2 cm nodule in the left thyroid lobe without lymphadenopathy. Fine-needle aspiration revealed a follicular neoplasm. Left hemithyroidectomy was carried out uneventfully. Three hours postoperatively, the patient started to complain of dysarthria, dysphagia and odynophagia with clinical sign of tongue deviation to the left side. Head and neck CT ruled out mass effect or ischemic event, and the diagnosis of left HNP was established. Four months postoperatively, the palsy was completely resolved. Histopathology examination of the thyroid nodule showed follicular adenoma, and no further intervention was provided.

DISCUSSION: Few cases of HNP are reported in the literature following oropharyngeal manipulation. Factors such as the type of surgery, position changes, and intubation characteristics have been linked to the incidence of HNP. Most of the cases recovered spontaneously, indicating a neuro-paxic type of injury. One case of HNP was reported following robotic total thyroidectomy, which was referred to as iatrogenic complication, and resulted in permanent paralysis. We believe that our case is the only reported case of transient ipsilateral HNP following a conventional left hemithyroidectomy.

CONCLUSION: Strap muscles retraction and neck extension during thyroidectomy could predispose to HNP.

© 2018 The Author(s). Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Hypoglossal nerve palsy (HNP) is a rare but well-recognized complication of airway management [1,2,16]. Few reviews and reports have postulated its pathophysiological pattern and predisposing factors [1–6,17]. Its pathophysiology refers to a neuro-paxic type of damage since most of the cases recover progressively [1,7]. In addition, variable factors have been linked to HNP such as the type of surgery, position changes, and intubation characteristics. To the best of our knowledge, this is the only reported case of HNP in the ipsilateral site following left hemithyroidectomy. This work has been reported in accordance with the SCARE criteria [8].

2. Case report

2.1. Patient information

A 47-year-old female presented to the clinic with a history of left thyroid swelling for one year, no change in voice, no dysphasia, no family history of malignancy or similar episode, and no history of hyper or hypothyroidism symptoms.

2.2. Clinical findings

Left thyroid nodule (non-tender) of about 2 × 2 cm, no skin changes, and no lymphadenopathy.

3. Diagnostic assessment

3.1. Thyroid function tests

The findings were within the normal limit.

* Corresponding author at: King Faisal University, College of Medicine, Alahsa, 31982, P.O. Box: 45253, Saudi Arabia.

E-mail address: mbubshait@kfu.edu.sa (M. Bu Bshait).

3.2. Ultrasound thyroid

Asymmetrically enlarged left thyroid lobe, showing heterogeneous nodule medially measuring 28 × 24 × 32 mm. A small partly cystic nodule is noted in the right lobe, measuring 9 × 5 mm. No significant cervical lymph nodes.

3.3. Fine-needle aspiration

Bethesda 4 (Follicular Neoplasm).

3.4. Pre operative laryngoscopy

Normal movement of the vocal cords.

4. Therapeutic intervention

After the induction of general anesthesia using a 7-mm endotracheal tube, the patient's neck was extended on a long beanbag that supported the neck in full extension. The patient was then placed in semi-Fowler's position to decompress the neck veins. The bed was turned 90° from the anesthetologist, and the procedure was carried out uneventfully through a transverse collar incision. During extubation, the vocal cords were examined and the bilateral vocal folds were found to be mobile and functioning.

5. Follow-up

Three hours after the operation, the patient complained of dysarthria, dysphagia, and odynophagia. On examination, her tongue was deviated to the left side. CT scan of the head and neck showed normal findings. The patient was diagnosed with left HNP at ENT consultation. A two-day course of corticosteroid was initiated and the patient was discharged two days postoperatively with outpatient follow-up. At the two-week follow-up, the patient showed improved symptoms, but the tongue was still deviated to the left. Histopathology of the left thyroid gland revealed follicular adenoma. Four months postoperatively, the patient was evaluated in the clinic with resolution of the symptoms, resulting in no tongue deviation.

6. Discussion

Intrinsic and extrinsic muscles of the tongue, except the palatoglossus muscle, are innervated by the cranial nerve XII, named hypoglossal nerve [7]. Anatomically, it has intracranial and extracranial parts. The intracranial part arises from the medulla oblongata as small roots, which merge to form two main trunks. Then it leaves the skull through the hypoglossal canal. When the nerve leaves the inferior portion of the canal, the extracranial part of the nerve begins. It rests on the lateral prominence of the anterior surface of C1 transverse process. Subsequently, the hypoglossal nerve descends between the internal jugular vein and internal carotid artery. At the angle of mandible, it courses anteriorly and deep to the posterior belly of the digastric muscle. Eventually, the nerve forms numerous fibers as it enters the mouth [2,7,9,10].

HNP might present as dysphagia or dysarthria, and its pathognomonic clinical finding is ipsilateral tongue deviation [9,11]. Such unexpected postoperative presentation would alert the surgical or anesthesia team to consider more serious conditions like ischemic stroke or mass effect requiring prompt investigations. We had obtained a CT scan of the head and neck that excluded such conditions.

In most cases, these findings were noticed on day one postoperatively [2,6]. However, in our case, we recognized the symptoms

three hours following the surgery; this is similar to a few reported cases [3–5].

Dziewas and Ludemann [2] reviewed 25 cases of HNP and postulated the different causes in accordance with the method of oropharyngeal manipulations. Although most of the HNPs occurred after orotracheal intubation, a few cases were found to occur after bronchoscopy and laryngeal mask airway placement. Contrary to our case, the dominant site of nerve affection was found to be the right side. Previous two findings suggested that direct laryngoscope compression to the lateral roots of the tongue while sweeping it to the left is the proposed factor. Nevertheless, different sites of the nerve course have been suggested under pathogenesis. These were anatomically correlated to the changes that occur during intubation and oropharyngeal manipulation. Micheal and Brusis [12] demonstrated the strain on the hypoglossal nerve during anterior tongue displacement and sniffing position for intubation. They suggested that this strain might contribute to the development of HNP.

Recently, Shah et al. [1] reviewed 69 patients who got HNP following airway management for general anesthesia, either isolated unilateral, bilateral HNP (66.7%) or combined with lingual (11.6%) or with recurrent laryngeal nerve (21.7%). Unlike our case, a majority of reviewed cases were found to be in males, which can be explained by the larger dimensions of the hyoid bone [13,14]. Increased endotracheal or laryngeal mask airway cuff pressure was correlated to probable injurious malposition. Furthermore, otolaryngology was the most common surgical specialty associated with subsequent HNP. It is believed that laryngeal pack during these surgeries facilitated the development of nerve compression over the greater corn of hyoid bone [6,15]. They hypothesized that position changes during intubation and surgical preparation might predispose to hypoglossal nerve trauma [4,6,16,17]. Although steroid showed some effect on Bell's palsy [18], there were no differences noted in the recovery period between patients who used steroids and those who did not use steroids [1]. However, we gave a short course of corticosteroid, and the patient recovered at 4 months. Similarly to our case, about 80% of the patients recovered within 6 months [1,2].

Collectively, HNP is a multi-etiological condition, which is rarely considered to be a complication of thyroidectomy when the neck dissection is combined [19]. Only one case was reported of HNP following robotic total thyroidectomy for papillary cancer, which was referred to an iatrogenic complication that resulted in permanent paralysis [20]. Nevertheless, we performed conventional hemithyroidectomy and the injury was transient, supporting the compression type of injury. We hypothesized that, in addition to the postulated oropharyngeal manipulation factors, superolateral strap muscles retraction might contribute to HNP development. Moreover, neck extension may stretch the nerve over C1 transverse process, making the nerve more vulnerable to injury. **In conclusion**, the neck extension and retraction of the strap muscles during thyroidectomy could predispose to HNP. Careful evaluation and imaging investigation are mandatory to rule out more serious complications. Mainstay treatment is supportive with follow-up till the palsy is completely recovered.

Conflict of interest

Authors deny any conflict of interest.

Funding

There are no sponsors or special funding for writing or publication of this case report.

Ethical approval

Approval has been granted by the institute Clinical Research Committee based on written consent from the patient.

Consent

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

Author contribution

Mohammed Bu Bshait: Wrote the manuscript.
Hassan Alyami: Operated the patient, and review the manuscript.
Emad AL-Osail: Collected the data for the case report.
Haytham Al Arfaj: collected the data for the case report.

Registration of research studies

Not applicable.

Guarantor

Mohammed Bu Bshait and Hassan Alyami.

References

- [1] Shah, et al., Hypoglossal nerve palsy after airway management for general anesthesia: an analysis of 69 patients, *Anesth. Analg.* 120 (1) (2015) 105–120.
- [2] R. Dziewas, P. Ludemann, Hypoglossal nerve palsy as complication of oral intubation, bronchoscopy and use of the laryngeal mask airway, *Eur. Neurol.* 47 (2002) 239–243.
- [3] A. Stewart, W. Lindsay, Bilateral hypoglossal nerve injury following the use of the laryngeal mask airway, *Anaesthesia* 57 (2002) 264–265.
- [4] N.K. Hung, C.H. Lee, S.M. Chan, C.C. Yeh, C.H. Cherng, C.S. Wong, C.T. Wu, Transient unilateral hypoglossal nerve palsy after orotracheal intubation for general surgery, *Acta Anaesth. Taiwan* 47 (2009) 48–50.
- [5] J. Brimacombe, G. Clarke, C. Keller, Lingual nerve injury associated with the proseal laryngeal mask airway: a case report and review of the literature, *Br. J. Anaesth.* 95 (2005) 420–423.
- [6] F. Tesei, L.M. Poveda, W. Strali, L. Tosi, G. Magnani, G. Farneti, Unilateral laryngeal and hypoglossal paralysis (Tapia's syndrome) following rhinoplasty in general anaesthesia: case report and review of the literature, *Acta Otorhinolaryngol. Ital.* 26 (2006) 219–221.
- [7] G. Bademic, M.G. Yasargil, Microsurgical anatomy of the hypoglossal nerve, *J. Clin. Neurosci.* 13 (2006) 841–847.
- [8] R.A. Agha, A.J. Fowler, A. Saetta, I. Barai, S. Rajmohan, D.P. Orgill, for the SCARE Group, The SCARE statement: consensus-based surgical case report guidelines, *Int. J. Surg.* 34 (2016) 180–186.
- [9] H.C. Lin, P.E. Barhaus, Cranial nerve XII: the hypoglossal nerve, *Semin. Neurol.* 29 (2009) 45–52.
- [10] A.I.J. Brain, Course of the hypoglossal nerve in relation to the position of the laryngeal mask airway, *Anaesthesia* 50 (1995) 82–83.
- [11] W.R. Gowers, *A Manual of Diseases of the Nervous System*, Hafner Pub. Co, Darien, Conn, 1970.
- [12] O. Michel, T. Brusis, Hypoglossal nerve paralysis following tonsillectomy, *Laryngorhinootologie* 69 (1990) 267–270.
- [13] K. Ito, S. Ando, N. Akiba, Y. Wataneb, Y. Okuyama, H. Moriguchi, K. Yoshikawa, T. Takahashi, M. Shimada, Morphological study of the human hyoid bone with three-dimensional ct images-gender difference and age-related changes, *Okajimas Folia Anat. Jpn.* 89 (2012) 83–92.
- [14] S.C. Kindschuh, T.L. Dupras, L.W. Cowgill, Determination of sex from the hyoid bone, *Am. J. Phys. Anthropol.* 143 (2010) 279–284.
- [15] E.G. Lykoudis, K. Seretis, Tapia's syndrome: an unexpected but real complication of rhinoplasty: case report and literature review, *Aesthetic Plast. Surg.* 36 (2012) 557–559.
- [16] S.O. Cinar, H. Seven, U. Cinar, S. Turgut, Isolated bilateral paralysis of the hypoglossal and recurrent laryngeal nerves (Bilateral Tapia's syndrome) after transpolar intubation for general anaesthesia, *Acta Anaesth. Scand.* 49 (2005) 98–99.
- [17] R.C. Mullins, D. Drez Jr, J. Cooper, Hypoglossal nerve palsy after arthroscopy of the shoulder and open operation with the patient in the beach-chair position. A case report, *J. Bone Joint Surg. Am.* 74 (1992) 137–139.
- [18] G. Lagalla, F. Logullo, P. Di Bella, L. Provinciali, M.G. Ceravolo, Influence of early high-dose steroid treatment on bell's palsy evolution, *Neurol. Sci.* 23 (2002) 107–112.
- [19] M.P. Prime, J.I. De Diego, J.M. Verdaguier, N. Sastre, I. Rabanl, Neurological complications following neck dissection, *Eur. Arch. Otorhinolaryngol.* 263 (2006) 473–476.
- [20] S.W. Ahn, K.H. Kang, Hypoglossal nerve palsy following the robotic thyroidectomy for the papillary thyroid carcinoma: a case report, *Int. J. Surg. Case Rep.* 14 (2015) 133–135.

Open Access

This article is published Open Access at [sciencedirect.com](https://www.sciencedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.