



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Hypoglossal nerve palsy following the robotic thyroidectomy for the papillary thyroid carcinoma: A case report

Suk-Won Ahn^a, Kyung Ho Kang^{b,*}^a Department of Neurology, Chung-Ang University Hospital, Chung-Ang University College of Medicine, Seoul, Republic of Korea^b Department of Breast and Endocrine Surgery, Chung-Ang University Hospital, Chung-Ang University College of Medicine, Seoul, Republic of Korea

ARTICLE INFO

Article history:

Received 15 March 2015
 Received in revised form 8 July 2015
 Accepted 8 July 2015
 Available online 18 July 2015

Keywords:

Robotic thyroidectomy
 Thyroid cancer
 Hypoglossal nerve palsy

ABSTRACT

BACKGROUND: Endoscopic surgical techniques with robotic system in the thyroid cancer have been reported to show good results and advantages; however the risk of these techniques has not been fully documented.

PRESENTATION OF THE CASE: We experienced an uncommon complicated case of a 20-year-old woman with a papillary thyroid carcinoma. After the robotic thyroidectomy, she complained of the tongue deviation, speech and swallowing difficulties of hypoglossal nerve palsy.

DISCUSSION: In this case, a few etiologies could be suggested for the development of hypoglossal nerve palsy. It might be associated with direct stretching or entrapment of hypoglossal nerve during tumor resection; lateral placement of the laryngoscope on the tongue base; the hyperinflation of the laryngeal mask airway; and histological disruption of the intraneural connective tissue and blood circulation.

CONCLUSION: Although the robotic surgery is a creative technique and has been known to be safe and effective, the risk of this surgery including traumatic nerve injury should be taken into account before surgery.

© 2015 The Authors. Published by Elsevier Ltd. on behalf of Surgical Associates 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

Recently the endoscopic surgical techniques with robotic system in the thyroid cancer have been reported to have several advantages including cosmetic effect, non-invasive and less painful procedure, and short period of hospitalization [1–4]. However, the risk of these techniques involving the adjacent structure such as parathyroid glands, recurrent laryngeal nerves, and superior and inferior thyroid vessels, has not been fully documented. We will describe an unusual neurological complication of hypoglossal nerve palsy after endoscopic thyroidectomy combined with robotic systems.

2. Case report

A 20-year-old woman presented with tongue deviation, speech disturbance and swallowing difficulty following the robotic systems assisted thyroidectomy. Previously, she had had an about 7 mm sized, poor enhancing and well-defined thyroid nodules by neck computer tomography (CT) (Fig. 1A and B). Thyroid fine needle

aspiration (FNA) cytology had confirmed the papillary thyroid carcinoma, followed by an endoscopic thyroid lobectomy with central lymph node dissection by using a robotic system.

During the operation, the patient was placed on the operative table in supine position under the endotracheal intubated and general anesthesia. Skin incision was made above the suprasternal notch and the sternothyroid and sternocleidomastoid muscle was retracted to each side laterally for the exposure of thyroid gland, and to conclude the thyroid carcinoma was successfully removed by using a robotic system. However, she complained of the tongue deviation to the left side, speech disturbance and swallowing difficulty coinciding with hypoglossal nerve palsy after thyroidectomy (Fig 1C). Therefore we checked the nerve conduction study (NCS) to confirm the hypoglossal nerve injury. Both hypoglossal NCSs were performed on all subjects using a standard published technique [5,6]. Both a recording and a reference electrode, positioned 2 cm apart on a tongue blade, were placed on the dorsal surface of the hemi-tongue, over intrinsic tongue muscles. A ground electrode was placed on the cheek. Bipolar percutaneous stimulation using 0.02 ms duration, 100 mA electrical stimulus was applied along the base of the mandible, with pressure applied to the stimulator. The duration of the electrical stimulus was gradually increased until a supramaximal compound muscle action potential (CMAP) wave form was achieved. The result of NCS revealed that the wave form of left hypoglossal nerve was not recorded, whereas the amplitude

* Corresponding author at: Department of Breast and Endocrine Surgery, Chung-Ang University Hospital, Chung-Ang University, College of Medicine, 29 Heukseok-ro, Dongjak-gu, Seoul 156-755, Republic of Korea. Fax: +82 2 6299 3125.

E-mail address: poplipss@hanmail.net (K.H. Kang).

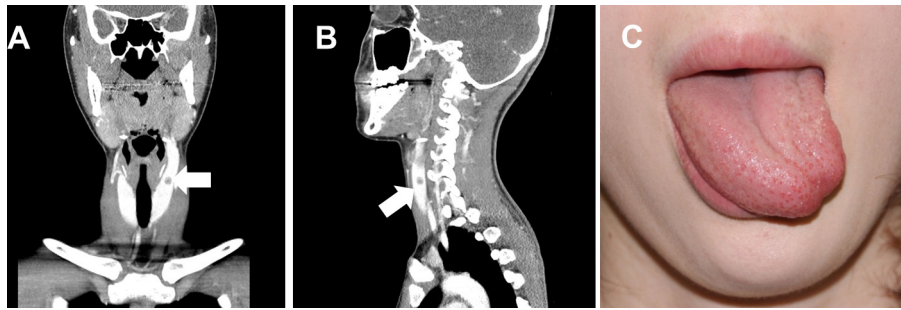


Fig. 1. The neck computer tomography (CT) of the patient revealed poor enhancing and well-defined nodules in left upper pole (A and B, white arrow). The tongue of the patient was deviated to the left side indicating of hypoglossal nerve palsy (C), after endoscopic thyroidectomy combined with da Vinci robotic systems.

and latency of right hypoglossal nerve were normal by published normal values [5].

As a result, our patient was diagnosed as left hypoglossal nerve palsy which was iatrogenic complication resulted from the endoscopic thyroidectomy with using robotic system. We carefully observed the changes of symptoms for 6 months, and her speech and swallowing slightly improved, however the tongue deviation sustained without remarkable improvement.

3. Discussion

To our knowledge, the hypoglossal nerve palsy after endoscopic thyroidectomy with using robotic system has not been reported yet. Previously, a few complicated cases of hypoglossal nerve injury have been documented involving iatrogenic cases from traction or dissection around the hypoglossal nerve during laryngeal surgery, cervical spine surgery, carotid endarterectomy or laryngeal mask [5,7,8]. And hypoglossal nerve palsy presented with clinical symptoms with deviation of the tongue to the same side of injury, tongue biting, swallowing difficulty, tongue atrophy and dysarthria [5,7,8]. However, because the anatomical pathway of the hypoglossal nerve does not run directly through the thyroid tissue, the hypoglossal nerve palsy after endoscopic thyroidectomy is extremely unusual [7,8].

In our case, a few etiologies could be suggested for the development of hypoglossal nerve palsy. First of all, a thyroid cancer of the patient was extended to superior pole adjacent to the hyoid bone level where the hypoglossal nerve runs closely and vulnerable to the compression, therefore, it might be associated with mechanical stretching or entrapment of hypoglossal nerve during tumor resection. However such cases have been very rare due to anatomical distance. Next, the hypoglossal nerve palsy of our patient might be associated with anesthetic procedures including the forceful placement of the laryngoscope on the lateral tongue base, hyperextension of the head, cricoid pressure, tight oropharyngeal packs, and hyperinflation of the laryngeal mask airway [8]. Finally, the continuous compression of some causes might disrupt the intraneural connective tissue and inhibit the intraneural blood circulation resulting in axonal damage.

Nevertheless, unfortunately we cannot confirm the definite etiology of hypoglossal nerve palsy in this case. And we did not explore the area to repair the hypoglossal nerve injury, because our patient wanted to observe the clinical progress without repair, and previous most cases have reported that iatrogenic hypoglossal nerve palsy showed the good improvement [5,7,8].

In conclusion, we experienced a 20-year-old woman with hypoglossal nerve palsy after performing robotic thyroidectomy, and this complicated case shows that although the robotic surgery is a creative technique and has been known to be safe and effective,

the risk of this surgery including hypoglossal nerve palsy should be taken into account before surgery.

Conflict of interest

There are no conflicts of interest. The authors report no disclosures.

Funding

Sponsors had no involvement in the drafting of the paper.

Ethical approval

Ethical Committee of the Chung-Ang University Hospital.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authors' contributions

Suk-Won Ahn: concept, writing the paper, submission etc.
Kyung Ho Kang: review of the paper, surgical intervention.

Guarantor

Suk-Won Ahn.

Acknowledgment

This Research was supported by a grant from the Basic Science Research Program through the National Research Foundation of Korea, funded by the Ministry of Science, ICT and Future Planning(NRF-2014R1A1A1005484).

References

- [1] N.R. Jackson, L. Yao, R.P. Tufano, E.H. Kandil, Safety of robotic thyroidectomy approaches: meta-analysis and systematic review, *Head Neck* 36 (2014) 137–143.
- [2] S.W. Kang, S.C. Lee, S.H. Lee, et al., Robotic thyroid surgery using a gasless, transaxillary approach and the da Vinci S system: the operative outcomes of 338 consecutive patients, *Surgery* 146 (2009) 1048–1055.
- [3] K.E. Lee, H. Koo do, H.J. Im, et al., Surgical completeness of bilateral axillo-breast approach robotic thyroidectomy: comparison with conventional open thyroidectomy after propensity score matching, *Surgery* 150 (2011) 1266–1274.
- [4] J.C. Cabot, C.R. Lee, L. Brunaud, D.A. Kleiman, W.Y. Chung, T.J. Fahey 3rd, R. Zarnegar, Robotic and endoscopic transaxillary thyroidectomies may be cost

- prohibitive when compared to standard cervical thyroidectomy: a cost analysis, *Surgery* 152 (2012) 1016–1024.
- [5] S. Ramchandren, K.L. Gruis, R.D. Chervin, et al., Hypoglossal nerve conduction findings in obstructive sleep apnea, *Muscle Nerve* 42 (2010) 257–261.
- [6] S.W. Ahn, S.H. Kim, J.E. Kim, et al., Reproducibility of the motor unit number index (MUNIX) in normal controls and amyotrophic lateral sclerosis patients, *Muscle Nerve* 42 (2010) 808–813.
- [7] A. Stewart, W.A. Lindsay, Bilateral hypoglossal nerve injury following the use of the laryngeal mask airway, *Anaesthesia* 57 (2002) 264–265.
- [8] R. Dziejwas, P. Ludemann, Hypoglossal nerve palsy as complication of oral intubation, bronchoscopy and use of the laryngeal mask airway, *Eur. Neurol.* 47 (2002) 239–243.

Open Access

This article is published Open Access at scimedirect.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.