HAYDARPAŞA NUMUNE MEDICAL JOURNAL

DOI: 10.14744/hnhj.2021.44452
Haydarpasa Numune Med J 2023;63(1):58–61

ORIGINAL ARTICLE

Demographic Properties of Patients who Underwent Lateral Lymph Node Neck Dissection Because of Thyroid Cancers

Ali Aktekin[1], Günay Gürleyik[2], Umut Kına[2], Zuhal Özcan[3], Meryem Doğan[3]

[1]Department of General Surgery, Giresun University, Medical Faculty, Giresun, Türkiye
[2]Department of General Surgery, University of Health Sciences, Haydarpasa Numune Training and Research Hospital, Istanbul, Türkiye
[3]Department of Pathology, University of Health Sciences, Haydarpasa Numune Training and Research Hospital, Istanbul, Türkiye

Abstract

Introduction: Lymph node dissections due to thyroid cancers from neck are difficult and many anatomic structures are in danger to be injured. We present our some lateral lymph node neck dissection experiences in thyroid cancers.

Methods: Demographic, clinical, and pathologic data of the patients who underwent lateral lymph node dissection between January 1, 2017, and December 31, 2019. Routine dissections of IIA, III, IV, and VB were performed. In addition, we added IIB and VA in cases when metastasis confirmed in papillary thyroid cancers (PTC). We completely dissected compartment II to V in the cases of medullary thyroid cancers. Post-operative concerned hemorrhage, nerve injury, chyle leakage, and whether received RIA treatment, the presence of loco-regional relapse and mortality was documented.

Results: We performed neck dissection in 14 women and 14 men, with an average age of 45.7 (20–78). Histopathological examination revealed that 25 patients had papillary, two medullary thyroid, and one patient had mixed medullary and PTCs. Bilateral neck dissection was performed in five patients. Tumor stages were T1 in 13, T2 in two, T3 in 12, and T4 in one patient. An average of 26.8 (8–72) lymph nodes was dissected from the lateral compartments and metastatic ones were 4.6 (0–20). We had three thoracic duct leakages and three local edemas. All three leakages were dissolved end resolved spontaneously with long lasting drains without negative pressure aspiration and employing slight compression locally. Only 22 patients could receive RIA. The recurrence in the thyroid location and/or lateral lymph node compartment was seen in five patients. Mortality was seen in two patients due to other reasons.

Discussion and Conclusion: Management of patients with papillary thyroid carcinoma should involve a balance in the risk from treatment and disease so decisions to perform neck dissection should be made individually. An oncological complete surgical resection is to remove all gross metastatic disease and preserving vital neurovascular structures. A thyroid surgeon should know the indications, the anatomic structures at lateral neck region and also techniques to decrease the rates of locoregional recurrences, to improve survival, and to prevent the occurrence of some serious complications.

Keywords: Lateral neck dissection; medullary thyroid cancer; papillary thyroid cancer.

Regional lymph node metastases are seen in the majority of patients with papillary thyroid cancer (PTC) and medullary thyroid cancer (MTC) in contrast to follicular and Hurthle cell carcinoma[1,2]. With technical progression in imaging modalities and improvements in biochemical testing and measuring thyroglobulin and calcitonin led to an increased rate of detection of lymph node metastases of thyroid cancers. Lymphatic drainages of the thyroid gland are first lymph nodes in the central neck compartment (CNC) (level VI) and then to the lower jugular chain (level

Correspondence (İletişim): Ali Aktekin, M.D. Department of General Surgery, Giresun University, Medical Faculty, Giresun, Türkiye
Phone (Telefon): +90 532 598 72 07 **E-mail (E-posta):** draliaktekin@yahoo.com
Submitted Date (Başvuru Tarihi): 09.03.2021 **Revised Date (Revize Tarihi):** 09.03.2021 **Accepted Date (Kabul Tarihi):** 28.03.2021

IV) and to the upper mediastinum (level VII). Sometimes, the upper pole lesions can metastasize to the lateral neck with skip metastasis to CNC[3]. Lymph node dissections from neck compartments are difficult and challenging operations and many anatomic structures are in danger to be injured and some arguments still exist in the indications and also in the extension of lymph node dissection in thyroid cancers.

We present our patients with thyroid cancers with lymph node metastasis at lateral neck compartment and our lateral lymph node neck dissection (LLND) experiences in thyroid cancers.

Materials and Methods

Retrospectively, demographic, clinical, and pathologic data of the patients who underwent LLND between January 1, 2017, and December 31, 2019, were collected, including gender, age, multifocality, bilaterality, tumor size, tumor site, presence of multifocality, T-stage of the tumor, and number of dissected and involved of the lymph nodes in lateral compartment. Data were collected retrospectively from patient files and computer records. If the patient had multiple malignant nodules in the thyroid gland, the diameter of the largest was recorded as the tumor size. If lateral lymph node metastasis was evident on pre-operative imaging examination or proved by fine needle aspiration cytology, a functional LLND was performed. In the present of central lymph node metastases in MTC, LLND was performed. We documented complications belong to LLND procedure, whether these patients received RIA treatment, the presence of loco-regional relapse and mortality in patients underwent LLND. Diagnosis of metastatic lymph nodes was decided with high thyroglobulin levels in serum after thyroid surgery, demonstration of some pathologic lymph nodes at lateral neck lymph nodes and cytological examination of fine needle aspiration biopsy (FNAB) materials and high thyroglobulin levels in washout of any suspicious lymph nodes. This study has been done with the permission and approval of our hospital comity numbered TUEK 771/12/2019.

Routine dissection of IIA, III, IV, and VB was performed in LLND procedures. In addition, in cases where metastasis confirmed with pre-operative FNAB or intraoperative macroscopic metastasis in Group IIB and VA, we added Group IIB and VA to dissection. We completely dissected compartment II and V in the cases of MTC. We used intraoperative nerve monitoring and documented and traced the other major nerve trunks during LLND procedure to preserve these nerves.

Post-operative complications were also evaluated and mainly concerned hemorrhage, nerve injury, or chyle leakage. Although hypoparathyroidism and vocal cord paralysis belong to CND, we also documented and presented in this article. Serum calcium <8 mg/dL within 6 months after surgery was defined as temporary and after 6 months was regarded as permanent hypoparathyroidism. Vocal cord paralysis, found within 6 months was defined as temporary but if lasted longer than 6 months after the operation was defined as permanent laryngeal nerve injury. Recurrence was defined as local or regional disease requiring reoperation or any other treatment after 6 months of the operation and diagnosed by ultrasound and ultrasound-guided FNAB cytology. We conducted this study in accordance with the Declaration of Helsinki.

Results

We performed LLND in 14 women and 14 men, with an average age of 45.7 (20–78) at General Surgery Department, Haydarpasa Numune Education and Research Hospital. Histopathological examination revealed that 25 patients had papillary thyroid carcinoma and its subtypes, two patients had MTC, and one patient had mixed medullary and PTC. Bilateral LLND was performed in five patients. Tumor stages were T1 in 13 patients, T2 in 2 patients, T3 in 12 patients, and T4 in one patient. An average of 26.8 (8–72) lymph nodes was dissected from the lateral compartment by LLND. We found the number of metastatic lymph nodes was 4.6 (0–20) (Table 1).

We came across with nine complications as one recurrent nerve injury on one side, two temporary hypoparathyroidism, three thoracic duct leakages, and three local edemas. All three leakages were dissolved end resolved spontaneously long lasting drains without negative pressure aspiration and employing slight compression locally. One patient was missed during the follow-up period. Only 22 patients out of these 27 patients could receive RIA. The recurrence in the thyroid location and/or lateral lymph node compartment was seen in five patients and these five patients re-operated due to loco-regional recurrences.

Mortality was seen in two patients during the follow-up period. One of them had a tall cell variant of thyroid papillary cancer in a man with proven bilateral PTC metastases to bilateral lateral neck compartments and history of prostate cancer Bilateral LLND was performed. Unfortunately, there were also metastatic lymph nodes from prostate cancer among metastatic PTC lymph nodes. Other one was at an advanced age woman underwent LLND due to MTC.

Table 1. Demographic and pathologic properties of patients underwent lateral neck lymph node dissection dissection due to thyroid cancer

Gender	
Woman	14
Man	14
Age (year)	45.71 (20-78)
Sites of the primary tumor	
Right site	10
Left site	7
Isthmus	2
Bilateral	9
Size of the primary thyroid tumor (mm)	24.21 (6-71)
Presence of multifocality of primary thyroid tumor	
Present	10
Not present	18
Pathology of thyroid tumor	
Papillary	25
Medullary	2
Mix papillary and medullary	1
T stages of primary thyroid tumors	
T1	13
T2	2
T3	12
T4	1
Sites of the lateral neck dissection	
Right site	12
Left site	11
Bilateral	5
Number of the dissected lymph nodes	26.8 (8-72
Number of the metastatic lymph nodes	4.67 (0-20)

Discussion

The incidence of thyroid cancer is rapidly increasing and PTC is the most common histopathologic type. Some certain clinic-pathological features can show aggressive behavior. Male sex, young and old age, primary tumor size, extra-thyroidal extension, aggressive histological subtypes specific genotypes (e.g., BRAF) are the risk and predictive factors for lymph node metastases in PTC[4-6]. PTC metastasizes early and reported rates are as high as 80% after prophylactic neck surgery[7,8]. Thyroid cancers often metastasize to the central and lateral compartments of the neck. Surgical excision of clinically evident central or lateral nodal disease in PTC is accepted to be associated with improved outcomes in recurrence and survival[7,9]. It is mandatory to do lymph node dissection in MTC. The role of prophylactic LLND in PTC has not any survival benefit but may result in upstaging of diseases[4,6]. Management of patients with PTC should involve a balance in the risk from treatment and disease so decisions to perform LLND should be made individually.

Prophylactic CND is recommended in all cN0 cases because the rate of metastatic nodal disease is high in MTC[10]. MTC should undergo dissection of the central and ipsilateral LLND (levels II-V) if central compartment is affected. It is reported that even there is no any metastatic lymph nodes at the central neck nodes, the presence metastatic lymph nodes at the ipsilateral neck area is up to 10%. The calcitonin level is important in MDT and can predict status of disease and can be used to guide the extent of surgery[7]. Some reports have shown that in patients with one to three positive central lymph nodes, the presence metastatic lymph nodes at the ipsilateral lateral neck area increases up to 77% and even the risk is at 98% in patients with four or more positive central lymph nodes[11]. Therefore, in the presence of multiple metastatic lymph nodes in the central neck area, we should perform prophylactic LLND. According to some reports, contra lateral "prophylactic" LLND should be considered if serum calcitonin level is >200 pg/mL[7,10].

An oncological complete surgical resection requires all gross metastatic disease and also preserving vital neurovascular structures. The knowledge of anatomic structures and the lymph node levels is important[12]. The "berry-picking" removing results in high rates of recurrence and should be avoided. The extent of a resection in the lateral neck is mainly in levels IIa-Vb and all of these should be included in the surgical specimen[7]. Thyroid cancer rarely metastasizes to Level I and above the accessory nerve at neck so Levels I, IIB, and VA are not routinely exposed but pre-operative assessment and mapping of the involved lymph nodes are important.

During a LLND, internal jugular vein, common carotid artery, vagus, hypoglossal, spinal, phrenic nerves, sympathetic trunk, and brachial plexus are at risk of injury. In addition, trachea, esophagus, laryngeal nerves, and parathyroid glands are also extensively exposed during CND. Using intraoperative nerve monitoring helped us to localize the major nerves and following the traces their trunks during LLND procedure allowed us to preserve these nerves. Surgical complications are so important and with serous results and include parathyroid injury, recurrent laryngeal nerve, chyle leakage, chronic neck pain, and Horner's syndrome[7]. We came across with nine complications as one recurrent nerve injury on one side, two temporary hypoparathyroidism, three thoracic duct leakages, and three local edemas. These mentioned first two complications are doe to CND, not due to LLND. Other expert groups report an overall complication rate ranging from 25 to 50% after

total thyroidectomy and lateral neck dissection[7,13,14]. Temporary and permanent hypocalcemia were reported 47 and 0%, respectively, and the rates for temporary and permanent recurrent laryngeal nerve injury were 5 and 0% but in other study reported as high as nearly 50%[15,16].

During the dissection of left level IV lymph nodes, we should pay special attention to the branch or trunk of the thoracic duct and could be damaged. It has been reported nearly 2% chyle leakage and they mostly treated successfully by strong negative pressure drainage, low-fat diet, or intracavitary injection of inactivated pseudomonas aeruginosa and even they needed reoperation to ligate thoracic duct[15]. On the other hand, we had only three thoracic duct leakage and we approached to all chyle leakages different than reported before. They were dissolved and resolved spontaneously with long lasting drains but without negative pressure aspiration but employing slight compression locally. We allowed all patients to have normal regular diet without any food restriction and not employed any local injections.

Thyroid cancers have a tendency to metastasize to loco-regional lymph nodes. A thyroid surgeon should know the indications, the anatomic structures at lateral neck region and also techniques of LLND to decrease the rates of loco-regional recurrences, to improve survival, and to prevent the occurrence of some serious complications.

Ethics Committee Approval: This study has been done with the permission and approval of our hospital comity numbered TUEK 771/12/2019.

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: A.A., G.G.; Design: A.A.; Supervision: A.A., G.G.; Data Collection or Processing: A.A., U.K., Z.O.; Funding: A.A., U.K., Z.O.; Materials: A.A., Z.O., M.D.; Analysis or interpretation: A.A., U.K.; Literature Search: A.A., U.K.; Writing: A.A., G.G.; Critical Review: A.A., G.G., Z.O.

Conflict of Interest: None declared.

Financial Disclosure: The authors declared that this study received no financial support.

References

1. Agrawal N, Evasovich MR, Kandil E, Noureldine SI, Felger EA, Tufano RP, et al. Indications and extent of central neck dissection for papillary thyroid cancer: An American head and neck society consensus statement. Head Neck 2017;39:1269–79.
2. Randolph GW, Duh QY, Heller KS, LiVolsi VA, Mandel SJ, American Thyroid Association Surgical Affairs Committee's Taskforce on Thyroid Cancer Nodal Surgery, et al. The prognostic significance of nodal metastases from papillary thyroid carcinoma can be stratified based on the size and number of metastatic lymph nodes, as well as the presence of extranodal extension. Thyroid 2012;22:1144–52. [CrossRef]
3. Park JH, Lee YS, Kim BW, Chang HS, Park CS. Skip lateral neck node metastases in papillary thyroid carcinoma. World J Surg 2012;36:743–7. [CrossRef]
4. Mizrachi A, Shaha AR. Lymph node dissection for differentiated thyroid cancer. Mol Imaging Radionucl Ther 2017;26(Suppl 1):10–5. [CrossRef]
5. Genpeng L, Jianyong L, Jiaying Y, Ke J, Zhihui L, Rixiang G, et al. Independent predictors and lymph node metastasis characteristics of multifocal papillary thyroid cancer. Medicine (Baltimore) 2018;97:e9619. [CrossRef]
6. Bonnet S, Hartl D, Leboulleux S, Baudin E, Lumbroso JD, Al Ghuzlan A, et al. Prophylactic lymph node dissection for papillary thyroid cancer less than 2 cm: Implications for radioiodine treatment. J Clin Endocrinol Metab 2009;94:1162–7. [CrossRef]
7. Asimakopoulos P, Nixon IJ, Shaha AR. Differentiated and medullary thyroid cancer: Surgical management of cervical lymph nodes. Clin Oncol (R Coll Radiol) 2017;29:283–9. [CrossRef]
8. Yan DG, Zhang B, An CM, Zhang ZM, Li ZJ, Xu ZG, et al. Cervical lymph node metastasis in clinical N0 papillary thyroid carcinoma. Zhonghua Er Bi Yan Hou Tou Jing Wai Ke Za Zhi [Article in Chinese] 2011;46:887–91.
9. Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, et al. 2015 American thyroid association management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer: The American thyroid association guidelines task force on thyroid nodules and differentiated thyroid cancer. Thyroid. 2016;26:1–133. [CrossRef]
10. Wells SA Jr, Asa SL, Dralle H, Elisei R, Evans DB, American Thyroid Association Guidelines Task Force on Medullary Thyroid Carcinoma, et al. Revised American thyroid association guidelines for the management of medullary thyroid carcinoma. Thyroid 2015;25:567–610. [CrossRef]
11. Machens A, Hauptmann S, Dralle H. Prediction of lateral lymph node metastases in medullary thyroid cancer. Br J Surg 2008;95:586–91. [CrossRef]
12. Uludağ M, Tanal M, İşgör A. Standards and definitions in neck dissections of differentiated thyroid cancer. Sisli Etfal Hastan Tip Bul 2018;52:149–63. [CrossRef]
13. Ito Y, Higashiyama T, Takamura Y, Miya A, Kobayashi K, Matsuzuka F, et al. Risk factors for recurrence to the lymph node in papillary thyroid carcinoma patients without preoperatively detectable lateral node metastasis: Validity of prophylactic modified radical neck dissection. World J Surg 2007;31:2085–91. [CrossRef]
14. Roh JL, Park JY, Park CI. Total thyroidectomy plus neck dissection in differentiated papillary thyroid carcinoma patients: Pattern of nodal metastasis, morbidity, recurrence, and postoperative levels of serum parathyroid hormone. Ann Surg 2007;245:604–10. [CrossRef]
15. Hu D, Zhou J, He W, Peng J, Cao Y, Ren H, et al. Risk factors of lateral lymph node metastasis in cN0 papillary thyroid carcinoma. World J Surg Oncol 2018;16:30. [CrossRef]
16. Moo TA, Umunna B, Kato M, Butriago D, Kundel A, Lee JA, et al. Ipsilateral versus bilateral central neck lymph node dissection in papillary thyroid carcinoma. Ann Surg 2009;250:403–8.