Journal of Surgery and Trauma 2016; 4(3-4): 58-61.

www.jsurgery.bums.ac.ir

ORIGINAL ARTICLE

Prevalence of parathyroid removal during total thyroidectomy in Rasoul Akram and Firozgar hospitals during 2013- 2014: A case-series study

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Received: January 27, 2017 ***Revised: June 10, 2017*** ***Accepted: June 15, 2017***

Abstract

Introduction: It is not a routine to remove the parathyroid glands during thyroidectomy except when they are ischemic or have malignancy. In this study, the prevalence of parathyroid removal during total thyroidectomy was assessed.

Methods: In this case-series study, 53 consecutive patients under total thyroidectomy in two general hospitals during 2013-2014 were enrolled. Serum parathormone values of the patients were assessed, and radioactive iodine uptakes were studied to check for preserved parathyroid gland in the postoperative phase. The obtained data were analyzed in SPSS 14.0.

Results: This study incorporated fifty-three consecutive patients under total thyroidectomy who were treated in Rasoul Akram and Firozgar general hospitals from 2013 to 2014. Forty-six patients (86.8%) had no parathyroid removal and 13.2% had parathyroid removal. Four patients had intra-thyroidal parathyroid gland in permanent pathology.

Conclusions: One-eighth of the subjects under total thyroidectomy would experience parathyroid removal which would not be a significant contributor, indicating a low chance of parathyroid removal during total thyroidectomy.

Key Words: Thyroidectomy; Parathyroidectomy; Thyroid; Parathyroid

Introduction

The four parathyroid glands behind thyroid secrete the parathormone hormone that contributes to vitamin D metabolism alongside calcitonin from thyroid (1, 2). Recognition of the upper and lower parathyroid glands (located posterior and anterior to recurrent laryngeal nerve, respectively) is essential to save the glands. Eighty percent of the parathyroid gland's blood supply is provided by the inferior thyroid artery

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(3, 4). Hence, to save the parathyroid glands during thyroidectomy, the inferior thyroid artery should not be ligatured and thus a good knowledge of the parathyroid glands is crucial (5, 6).

The parathyroid glands are not usually removed during thyroidectomy except due to ischemia or malignancy (7-10). Grafting the injured or inevitably removed parathyroid glands in the sternocleidomastoid or deltoid muscle sheath during total thyroidectomy with or without radical cervical dissection may prevent future persistent hypocalcemia (11, 12). This study assessed the prevalence of parathyroid removal during total thyroidectomy.

Materials and Methods

In this case-series study, all consecutive patients under total thyroidectomy in Rasoul Akram and Firozgar general hospitals in 2013 and 2014 were enrolled. The patients were assessed by the result of permanent pathology report for diagnosis of parathyroid gland preservation in the postoperative phase.

The patients were in supine in the semi-fowler or beach chair position with the neck in extension. In known cases of cervical spine injury, the patients are assessed by orthopedics or neurosurgeons. The cervical hyperextension may lead to headache, dizziness, and postoperative nausea. The skin was prepared from the lower lip and mandibular angle to the anterior chest. The groove between trachea and recurrent laryngeal nerve was marked by nasogastric or oral tube, a thermal probe, or esophageal stethoscope. The collar (Kocher) incision was performed in the anterior portion of the neck in midline according to the thyroid size and the patient's position. Patients with kyphosis and those with a large thyroid or neck required larger incisions. Plastima was cut one centimeter below the cricoid or two fingers above the sternal notch. The middle thyroid veins were discovered and subdivided. Also, the recurrent laryngeal nerve was marked and preserved. This study is registered in the Iran University of Medical Sciences ethics committee with the following code: IR.IUMS.REC.1392.9111105029.

The collected data were analyzed with SPSS 14.0 (SPSS Inc., USA) and expressed as the mean±SD or the frequency of the patients.

Results

In this case-series study, 53 consecutive patients under total thyroidectomy in Rasoul Akram and Firozgar general hospitals in 2013 and 2014 were enrolled. Mean age of the patients was 44.96 ±16.17 years. From among them, 38 patients (71.7%) were female and 15 patients (28.3%) were male. Multinodular goiter and papillary carcinoma were the most common diagnoses, with each observed in 26.4% of patients.

Forty-six patients (86.8%) had no parathyroid removal, whereas 13.2% had parathyroid removal. Four patients had intra-thyroidal parathyroid gland in permanent pathology (Table 1).

Table 1: Pathological diagnoses in patients

Diagnosis	Number	Frequency
Autoimmune thyroidism	1	1.9
Chemical mass + Medullary Carcinoma	1	1.9
Follicular adenoma (Hurthle Cell)	1	1.9
Follicular carcinoma	1	1.9
Follicular neoplasm	1	1.9
Follicular neoplasm with Hurthle Cell	1	1.9
Hoarseness and neck mass in a HIV+ patient	1	1.9
Hurthle cell lesion	1	1.9
Hyperthyroidism	1	1.9
Insular carcinoma	1	1.9
Laryngeal Squamous cell carcinoma	3	5.7
Metastatic papillary thyroid	1	1.9
Metastatic papillary thyroid + cervical lymphadenopathy	1	1.9
Micro papillary carcinoma	1	1.9
Multi-nodular goiter	14	26.4
Nodular goiter	1	1.9
Papillary + anaplastic carcinoma	1	1.9
Papillary carcinoma	14	26.4
Rule out of malignancy – anaplastic carcinoma	1	1.9
Rule out of malignancy	1	1.9
Rule out of malignancy + multi-nodular goiter	1	1.9
Retrosternal thyroid	1	1.9
Subtotal thyroidectomy	1	1.9
Thyroid enlargement with hypothyroidism	1	1.9
Thyroidal nodule	1	1.9
Total	53	100

Discussion

Total thyroidectomy is the method of choice for papillary, follicular, medulary, hurtle-cell, and if acceptable, for anaplastic and squamous malignancies. Use of frozen section during operation is to approve the malignancy of thyroid and parathyroid tissues. Also, frozen section is performed before auto-transplantation of parathyroid to diagnose the parathyroid from metastatic lymphatic glands or a part of thyroid. The complications of total thyroidectomy include hematoma, seroma, hypocalcaemia, nerve injury, RLN injury, vocal cord paresis, tracheal injury, and esophageal injury. To prevent postoperative hypoparathyroidism after total thyroidectomy, the parathyroid glands are preserved in situ and/or resected, or else, the devascularized parathyroid glands are autotransplanted (13).

The study by Schwartz et al (14) in the United States demonstrated that 18 percent of subjects had parathyroid removal which is close to the 13 percent rate found in our study. The study by Youngwirth et al (15) in the United States also revealed 12 percent rate for parathyroid removal like our study. Another study by Kuriloff and colleagues (16) in New York showed that by use of parathyroid autotransplantation method, none of the subjects under total thyroidectomy had parathyroid removal and their results were much better than our study.

Short- and long-term parathyroid failure after thyroidectomy is considered as three different metabolic syndromes: (I) postoperative hypocalcemia defined as a s-Ca <8 mg/dL (<2 mmol/L) within 24 hours after surgery requiring calcium/vit D replacement therapy at the time of hospital discharge; (II) protracted hypoparathyroidism as a subnormal iPTH concentration (<13 pg/mL) in need of calcium/vit D replacement for 4 to 6 weeks; and (III) permanent hypoparathyroidism as a subnormal iPTH concentration (<13 pg/mL) in need of calcium/vit D replacement until 1 year after total thyroidectomy. Each of these syndromes has its own pattern of recovery and should be approached with different therapeutic strategies (17).

The study by Sitges-Serra and colleagues (18) in Spain reported that out of 442 patients undergoing total thyroidectomy, 222 (50.2 percent) developed postoperative hypocalcaemia due to parathyroid removal and this was more significant than other studies and our study. AlQahtani et al's study (19) in Canada showed that PTH level in the first hour is predictive of symptomatic hypocalcemia one day after thyroidectomy. Since the study by Pradeep et al (20) in India showed that PTH after total thyroidectomy in vitamin D deficient patients is unreliable in predicting hypocalcemia and should not be relied on to plan early postoperative discharge, they used simultaneously the iodine uptake as a more reliable method to diagnose parathyroid removal in the patients. As a conclusion, the pathology report is the gold standard for exact diagnosis of parathyroid removal and other laboratory data like PTH must be confirmed with pathology as in other studies.

Conclusions

Finally, according to the obtained results in this study, it may be concluded that one-eighth of subjects under total thyroidectomy would experience parathyroid removal with no contributing factors and that the pathology report is the gold standard for exact diagnosis of parathyroid removal and other laboratory data like PTH must be confirmed with pathology as in other studies. However, given the limited sample size in this study, further studies with larger sample sizes should be carried out to attain more definite results.

Conflict of Interest

The authors declare no conflict of interest.

References

1. Krysiak R, Bartecka A, Okopień B. Rare abnormalities of parathyroid gland function and parathyroid hormone receptor action. Przegl Lek. 2014;71(1):36-47.
2. Krysiak R, Handzlik-Orlik G, Kedzia A, Machnik G, Okopień B. Hypoparathyroidism: the present state of art. Wiadomosci lekarskie (Warsaw, Poland: 1960). 2012 Dec;66(1):18-29.
3. Fukui S, Endo Y, Hirayama K, Taniyama H, Kadosawa T. Identification and preservation of the parathyroid gland during total thyroidectomy in dogs with bilateral thyroid carcinoma: a report of six cases. J Vet Med Sci. 2015;77(6):747-51.
4. Kim YS. Impact of preserving the parathyroid glands on hypocalcemia after total thyroidectomy with neck dissection. J Korean Surg Soc. 2012 Aug 1;83(2):75-82.
5. Yan L, Li S, Zhang S, Bai Y, Quan F, Zhao R. In situ preservation of parathyroid glands in total or near total thyroidectomy. Lin chuang er bi yan hou ke za zhi= Journal of clinical otorhinolaryngology. 2006 Nov;20(21):980-2.
6. Li ZD, Liu HW, Dong HL, Li SC. Preservation of parathyroid glands and their functions during total

thyroidectomy. Zhonghua er bi yan hou tou jing wai ke za zhi= Chinese journal of otorhinolaryngology head and neck surgery. 2010 Nov;45(11):899-903.

7. Khairy GA, Al-Saif A. Incidental parathyroidectomy during thyroid resection: incidence, risk factors, and outcome. Ann Saudi Med. 2011 May;31(3):274.
8. Rajinikanth J, Paul MJ, Abraham DT, Selvan CB, Nair A. Surgical audit of inadvertent parathyroidectomy during total thyroidectomy: incidence, risk factors, and outcome. Medscape J Med. 2009;11(1):29.
9. Lin DT, Patel SG, Shaha AR, Singh B, Shah JP. Incidence of inadvertent parathyroid removal during thyroidectomy. Laryngoscope. 2002 Apr 1;112(4):608-11.
10. Olson Jr JA, DeBenedetti MK, Baumann DS, Wells Jr SA. Parathyroid autotransplantation during thyroidectomy. Results of long-term follow-up. Ann Surg . 1996 May;223(5):472.
11. Moley JF, Skinner M, Gillanders WE, Lairmore TC, Rowland KJ, Traugott AL, Jin LX, Wells Jr SA. Management of the Parathyroid Glands During Preventive Thyroidectomy in Patients With Multiple Endocrine Neoplasia Type 2. Ann Surg. 2015 Oct;262(4):641-6.
12. Elmaksoud AE, Farahat IG, Kamel MM. Parathyroid gland autotransplantation after total thyroidectomy in surgical management of hypopharyngeal and laryngeal carcinomas: A case series. Ann Med Surg (Lond). 2015 Jun 30;4(2):85-8.
13. Kihara M, Yokomise H, Miyauchi A, Matsusaka K. Recovery of parathyroid function after total thyroidectomy. Surg Today. 2000 Mar 20;30(4):333-8.
14. Schwartz AE, Friedman EW. Preservation of the parathyroid glands in total thyroidectomy. Surg Gynecol Obstet. 1987 Oct;165(4):327-32.
15. Youngwirth L, Benavidez J, Sippel R, Chen H. Parathyroid hormone deficiency after total thyroidectomy: incidence and time. J Surg Res. 2010 Sep 30;163(1):69-71.
16. Kuriloff DB, Kizhner V. Parathyroid gland preservation and selective autotransplantation utilizing topical lidocaine in total thyroidectomy. Laryngoscope. 2010 Jul 1;120(7):1342-4.
17. Lorente-Poch L, Sancho JJ, Muñoz-Nova JL, Sánchez-Velázquez P, Sitges-Serra A. Defining the syndromes of parathyroid failure after total thyroidectomy. Gland Surg. 2015 Feb;4(1):82.
18. Sitges-Serra A, Ruiz S, Girvent M, Manjón H, Dueñas JP, Sancho JJ. Outcome of protracted hypoparathyroidism after total thyroidectomy. Br J Surg. 2010 Nov 1;97(11):1687-95.
19. AlQahtani A, Parsyan A, Payne R, Tabah R. Parathyroid hormone levels 1 hour after thyroidectomy: an early predictor of postoperative hypocalcemia. Can J Surg. 2014 Aug;57(4):237.
20. Pradeep PV, Ramalingam K. Postoperative PTH measurement is not a reliable predictor for hypocalcemia after total thyroidectomy in vitamin D deficiency: prospective study of 203 cases. World J Surg. 2014 Mar 1;38(3):564.