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Original Article

Intracapsular Total Thyroidectomy Experience and Outcome for Benign Thyroid Diseases

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Abstract

Background: The total intracapsular thyroidectomy is a new procedure that removes all the thyroid tissue for benign thyroid diseases and two third of thyroid capsule with better intraoperative and post-operative consequences and less operative time than the capsular dissection.and no recurrence rate of goiter or Graves' disease that was detected during the follow up period. **Objectives:** To evaluate the outcome of total intracapsular thyroidectomy of benign thyroid diseases in term of safety and efficacy. **Patients and Methods:** This is a prospective descriptive study carried out in department of general surgery including a total of 80 patients with benign thyroid disease who underwent intracapsular total thyroidectomy. Patients were followed up for 6 months to 3 years with a median of 41.4 months for postoperative complications. **Results:** The mean age of the patients was 42.72 ± 8.12 years. The majority of patients were females (87.5%). The study showed that 97.5 % of the patient had no intraoperative complications. Postoperatively, only 4 patients (5%) developed complications. The mean operative time and blood loss was 71.78 ± 9.32 min and 82.8 ± 32.5 ml, respectively. **Conclusion:** The total intracapsular thyroidectomy is new procedure and more sophisticated than other operation types to treat benign thyroid disease. However, it is safe and efficient.

Keywords: Intracapsular total thyroidectomy, intraoperative complications, postoperative complications

Introduction

Benign thyroid disease (BTD) affects almost 6% of the population.[1,2] Previously, subtotal thyroidectomy was considered the gold ordinary treatment for BTD because of its lower complication rates and reduced necessity for life-long hormone replacement treatment.[3,4] Nevertheless, an increased recurrence rates up to 43% may be probable after subtotal thyroidectomy.[5] It is because of this high rate, current guidelines suggest total thyroidectomy for both toxic and nontoxic benign multinodular goiter.[6,7]

However, the incidence rate of hypoparathyroidism for total thyroidectomy had been reported to be 1.6% to 50%. Interestingly, most patients experience transient hypoparathyroidism, and might recover within weeks to months after surgical procedure.[8] Only a small proportion was found with permanent hypoparathyroidism, ranging from 0.5% to 6.6%.[9]

The total intracapsular thyroidectomy is the new procedure that remove all the thyroid tissue for benign thyroid diseases and two third of thyroid capsule with better intraoperative and post-operative consequences and less operative time than the capsular dissection.[10]and also the mortality rate is 0% in total thyroidectomy.[11,12]

This study aimed to evaluate the outcome of intracapsular total thyroidectomy in the management of benign thyroid diseases in respect of safety, efficacy, and postoperative complications.

Materials and Methods

This is prospective study which was carried out in Department of General Surgery, Al-Imamain Al-Kadhumain medical city during the period from January2016 to May 2019 The study included a total of 80

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patients with benign thyroid disease who that need surgical intervention. The study was approved by Iraqi Council for Medical Specializations. A written consent from each participant was obtained prior to data collection after explaining the aim of study. The confidentiality of data throughout the study was guaranteed and the patients were assured that data will be used for research purpose only.

Patients confirmed or suspicious malignant thyroid disease such the presence of single nodule more 1cm, cervical lymph adenopathy or history of radiation, and those with primary retrosternal goiter were excluded from the study.

Operative technique

The operative technique of intracapsular total thyroidectomy is resemble to that for total capsular thyroidectomy in the preparation and operative steps except when the upper pole of the thyroid which was delivered by medial and lateral dissection, with ligation of the superior thyroid vessels by zero vicryle or by the use of ligature. Ligation of the inferior thyroid veins at the lower pole by 2\0 vicryle or by the use of ligature was also done. thyroid capsule was reflected off the gland with three tissue f orceps or mosquito clamps. A longitudinal incision was done by small scalpel size 11 in an avascular area of the lateral part of the thyroid capsule on the middle to distal part of the gland between lateral one third and two medial part. This longitudinal incision was extended by fine scissor until the whole thyroid capsule was opened and all the thyroid tissue enucleated [Figure 1]. With assistant of index finger, the lateral aspect of the thyroid capsule was pressed toward the trachea to control suspected bleeding from trachioesophagial branches or intracapsular inferior thyroid artery. Thyroid lobe was enucleated from the capsule and dissected from lateral to medial using bipolar diathermy for dissection and to control branches of inferior thyroid artery within the capsule without affection of parathyroid blood supply and away from recurrent laryngeal nerve. Dissection continued until separation of the lobe and isthmus from trachea. The other lobe then delivered and enucleated from the capsule in the same way. At the end, the complete gland was removed [Figure 2] leaving only part of the capsule behind. The capsule was closed by 3 zero vicryl to get good hemostasis without any injury to the RLN or parathyroid glands. A drain was left in each case and was removed on the third postoperative day, provided that the drainage volume was less than 50 ml/day.

Statistical analysis

The Statistical Software Program SPSS for Windows version 25 was used for data entry and analysis. Descriptive statistics was used to describe data. Quantitative data were presented by mean and standard deviation, while qualitative data were presented by frequency distribution.

Ethical consideration

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of

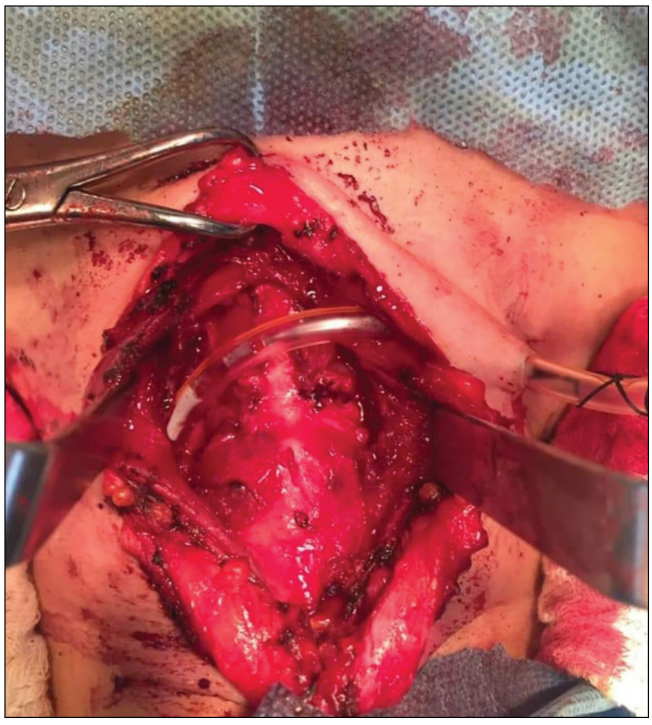

Figure 1: Total thyroid gland after longitudinal incision

Figure 2: Final thyroid specimen after intracapsular total thyroidectomy

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Table 1: Indication of thyroidectomy and different demographic parameters

Variables	Value
Age, years	
Mean±SD	42.72±8.12
Range	(24–64)
Gender	
Male	17(21.25%)
Female	63(78.75%)
Preoperative diagnosis	
Multinodular non-toxic goiter	65(81.25%)
Toxic multinodular goiter	6(7.5%)
Recurrent goiter	4(5%)
Toxic diffuse goiter	2(2.5%)
Retrosternal goiter	2(2.5%)
Thyroiditis	1(1.25%)
Indications for thyroidectomy	
More than one indications	48(60%)
Pressure symptoms	20(25%)
Large goiter (cosmetic)	6(7.5%)
Uncontrolled hyperthyroidism	4(5%)
Graves ophthalmopathy	2(2.5%)

Helsinki. It was carried out with patients verbal and analytical approval before sample was taken. The study protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document number 110 (including the number and the date in 13/11/2015) to get this approval.

Results

The mean age of the patients was 42.72±8.12 years (range 24–64 years). The majority of patients were females accounting for 78.75% of the patients. Multinodular non-toxic goiter was the most common diagnosis encountered in 81.25% of the patients. Much less frequently reported was toxic multinodular goiter (7.5%), recurrent goiter (5%), toxic diffuse goiter (2.5%), retrosternal goiter (2.5%) and finally thyroiditis (1%). In the most patients (60%) there were more than one indication for thyroidectomy. However, pressure symptoms were the most common indication reported in 25% of the patients. Large goiter, uncontrolled hyperthyroidism and Graves ophthalmopathy were less common indications encountered in 7.5%, 5% and 2.5% of the patients respectively [Table 1].

Preoperative characteristics of the patients (n=80)

Intraoperatively, no one of the patients developed RLN, accidental parathyroidectomy or hypoparathyroidism. However, one patient (1.25%) develop air filled cuff puncture by needle due to deep stitch to close the capsule to the trachea, The mean blood loss during operation was 82.8±32.5 ml. while the mean operative time was 71.781±9.32 min.

Table 2: Post-operative complications of total intracapsular thyroidectomy

Complications	Frequency (%)
Eye pain (exophthalmos worsening)	2 (2.5%)
Low pitch sound	1(1.25%)
Choking	1(1.25%)
Hospital stay, days	
Mean	1.2±0.81
Range	1–3

Postoperative complications

Post operatively, no one developed hypocalcaemia, hoarseness of voice. However, one patients (1.25%) developed low pitch sound, and one patient (1.25 %) develop chocking. Furthermore, eye pain (exophthalmos worsening) occur in 2.5% of the patients. The mean hospital stay was 1.2±0.81 (1–3 days). There was no evidence of recurrent goiter or hemorrhage during the follow up period that extended from 6 months to three years. [Table 2].

Discussion

Aimed to evaluate the outcome of intracapsular total thyroidectomy in the management of benign thyroid diseases in respect of safety, efficacy, and postoperative complications. The most important result of the present study that there was no postoperative RLN injury or accidental parathyroidectomy. These results are similar to study that include intracapsular dissection that done by Rageh et.al.[8] On the other hand, surgeries using capsular dissection showed RLN injury in 0.2% of the patients and accidental parathyroid gland injury in 6%.[10] Another study revealed a higher rate of RLN palsy of up to 2.3% after total thyroidectomy,[13] and exertional dyspnea is 0.3% of patients.[14] Furthermore, there was no hypocalcaemia, hoarseness of voice, strider, or aphonia in the present study. These results are in accordance with that obtained by Rageh *et al*.[8] Alternatively, hypocalcemia and hoarseness were reported in 35.9% and 2.7%, respectively of patients treated with capsular dissection.[10]

The main purpose of intracapsular total thyroidectomy is to keep the dissection more medially away from the RLN and parathyroid, this depend on two principles: anatomical position of RLN and parathyroid glands and inferior thyroid artery, and etiopathology of injury of RLN and parathyroid glands

The explanations of the zero percent of parathyroid gland injury intraoperatively and its injury sequences postoperatively (hypoparathyroidism and transient or perminanthypocalcemia) come from the idea of the anatomical position of the parathyroid glands and intracapsular way of dissection. Thyroid gland capsule is classified into true capsule and false capsule. The superior

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parathyroid glands actually located between the two capsules. While the inferior parathyroids glands may be located between the true and the false capsule, within the parenchyma of thyroid, or on the outer surface of the false capsule. Therefore, by the intracapsularprocedure at least two parathyroid glands reserved away from dissection and invented to be saved.[15]

Another essential factor, the inferior parathyroid gland takes its blood supply from the inferior thyroid artery. The superior parathyroid gland is also supplied by the inferior thyroid artery or by an anastomotic branch between the inferior thyroid and the superior thyroid artery.[15] Many parathyroids that have been carefully dissected on a long pedicle will infarct later on due to thrombosis of its friable vascular supply, or due to edema and swelling of the gland within its capsule.[16] Accordingly, intracapsular dissection only the intracapsular branches of inferior thyroid artery which are ligated and blood supply of parathyroid glands is kept intact.

In the present study, the recurrence rates for Graves diseases and multinodular goiters is lower than that of capsular dissection that done by Yoldas T et.al[17] and Snook KL et.al.[18] As a result, total intracapsular thyroidectomy is currently can be considered the surgical procedure of choice to treat Graves disease and multinodular goiter.

The operative time of this study was 71.78 ± 9.32 minute which is an acceptable time when compare with a German multicenter study, total capsular thyroidectomy took an average of 150 minutes that done by Okamoto *et al*.[14] which was due to the truth that no time was lost of total intracapsular thyroidectomy in dissection or recognition of the inferior thyroid artery, RLN, and parathyroid glands.

Collectively, these data suggest that intracapsular total has less intraoperative and post-operative complications and less operative time than the operation of total capsular dissection type. This procedure can be considered more cost effective than other surgical methods of capsular dissection that need nerve preservation devices.

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Conflicts of interest
There are no conflicts of interest.

References

1. Gough IR, Wilkinson D. Total thyroidectomy for management of thyroid disease. World J Surg 2000;24:962-5.
2. Bellantone R, Lombardi CP, Bossola M, Boscherini M, De Crea C, Alesina P, *et al*. Total thyroidectomy for management of benign thyroid disease: Review of 526 cases. World J Surg 2002;26:1468-71.
3. Bron LP, O'Brien CJ. Total thyroidectomy for clinically benign disease of the thyroid gland. Br J Surg 2004;91:569-74.
4. Younes N, Robinson B, Delbridge L. The aetiology, investigation and management of surgical disorders of the thyroid gland. Aust N Z J Surg 1996;66:481-90.
5. Bilezikian JP, Khan A, Potts JT Jr, Brandi ML, Clarke BL, Shoback D, *et al*. Hypoparathyroidism in the adult: Epidemiology, diagnosis, pathophysiology, target-organ involvement, treatment, and challenges for future research. J Bone Miner Res 2011;26:2317-37.
6. Shoback D. Clinical practice. Hypoparathyroidism. N Engl J Med 2008;359:391-403.
7. Cannizzaro MA, Lo Bianco S, Borzì L, Cavallaro A, Buffone A. The use of Focus harmonic scalpel compared to conventional haemostasis (knot and tie ligation) for thyroid surgery: A prospective randomized study. Springerplus 2014;3:639.
8. Rageh TM, El Gammal AS, Elsisi A, Gaber A. Intracapsular total thyroidectomy: No more complications in benign thyroid diseases. Egyptian J Surg 2016;35:445.
9. Alharbi F, Ahmed MR. Experience of thyroid surgery at tertiary referral centers in Jazan hospitals, Saudi Arabia. Interv Med Appl Sci 2018;10:198-201.
10. Chand G, Agarwal S, Mishra A, Agarwal G, Verma AK, Mishra SK, *et al*. The impact of uniform capsular dissection technique of total thyroidectomy on postoperative complications: An experience of more than 1000 total thyroidectomies from an endocrine surgery training centre in North India. Indian J Endocrinol Metab 2018;22:362-7.
11. Skandalakis LJ, Skandalakis JE, Skandalakis PN. Surgical Anatomy and Technique: A Pocket Manual. 3d ed. New York: Springer Science & Business Media LLC; 2009. pp. 33e38.
12. Leigh D. Total thyroidectomy: The evolution of surgical technique ANZ. J Surg 2003;73:761e768.
13. Thomusch O, Machens A, Sekulla C, Ukkat J, Brauckhoff M, Dralle H. The impact of surgical technique on postoperative hypoparathyroidism in bilateral thyroid surgery: A multivariate analysis of 5846 consecutive patients. Surgery 2003;133:180-5.
14. Okamoto T, Fujimoto Y, Obara T, Ito Y, Aiba M. Retrospective analysis of prognostic factors affecting the thyroid functional status after subtotal thyroidectomy for Graves' disease. World J Surg 1992;16:690-5; discussion 695-6.
15. Hedayati N, McHenry CR. The clinical presentation and operative management of nodular and diffused substernal thyroid disease. Am J Surg 2002;68:245-52.
16. Cohen JP. Substernal goiters and sternotomy. Laryngoscope 2009;119:683-8.
17. Yoldas T, Makay O, Icoz G, Kose T, Gezer G, Kismali E, *et al*. Should subtotal thyroidectomy be abandoned in multinodular goiter patients from endemic regions requiring surgery? Int Surg 2015;100:9-14.
18. Snook KL, Stalberg PL, Sidhu SB, Sywak MS, Edhouse P, Delbridge L. Recurrence after total thyroidectomy for benign multinodular goiter. World J Surg 2007;31:593-8; discussion 599-600.