

Intracapsular total thyroidectomy: no more complications in benign thyroid diseases

Tarek M. Rageh, Ahmed S. El Gammal, Alaa Elsisy, Ahmed Gaber

Department of General Surgery, Faculty of Medicine, Menoufia University, Menoufia, Egypt

Correspondence to Tarek M. Rageh, MD, Department of General Surgery, Faculty of Medicine, Menoufia University, Menoufia, 32511, Egypt, Mobile: 01003729938; Tel: +20 100 372 9938; e-mail: tarekrageh1975@gmail.com

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Introduction

There is ongoing debate on the operative management strategies for benign thyroid diseases in terms of safety and efficacy.

Aim

This study was conducted to evaluate the results of a new intracapsular thyroidectomy technique in the management of benign thyroid diseases.

Patients and methods

This is a prospective study carried out in Department of General Surgery, Menoufia University Hospital, from May 2014 to March 2016 on 50 patients with benign thyroid disease who were treated with a new surgical procedure: intracapsular total thyroidectomy.

Results

Fifty patients underwent intracapsular total thyroidectomy. There was no patient with transient or permanent recurrent laryngeal nerve injury and no complication of external laryngeal nerve injury. There was no complication of hypoparathyroidism with decreased operative time and hospital stay either.

Conclusion

Intracapsular thyroidectomy is an effective and safe procedure for benign thyroid diseases and can be performed easily by junior staff.

Keywords:

benign thyroid disease, intracapsular total thyroidectomy, intracapsular thyroidectomy complication

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Introduction

Goiter is a common benign endocrine disease with an incidence of 5–12% in the female population and 2–5% in the male population [1]. Surgery is one of the main lines of treatment for goiter, and the procedures traditionally performed are total, near total, and subtotal extracapsular thyroidectomy [2]. The aim of surgical treatment in nonmalignant thyroid diseases should be to treat the disease with a low complication rate and to decrease the incidence of recurrence because the risk for permanent complications have been found to be higher in reoperations for recurrent disease than in primary cases [3]. There is increasing demand towards more radical excision instead of a subtotal resection for nonmalignant goiter [4]. However, Muller *et al.* [5] reported that the rates of complications associated with total extracapsular thyroidectomy are 0.9% for recurrent nerve palsy 0.9% for hypocalcemia, 0.9% for wound infection, and 0.6% for secondary hemorrhage. Several authors have reported that total thyroidectomy can be performed safely for the management of bilateral nonmalignant goiter but complications still occurred even with a meticulous surgical technique [6,7].

Aim

The aim of this study was to evaluate the surgical outcome of intracapsular thyroidectomy as regards

safety, efficacy, and postoperative complications in the management of benign thyroid diseases.

Patients and methods

This is a prospective study carried out in Department of General Surgery, Menoufia University Hospital, from May 2014 to March 2016 on 50 patients with thyroid swelling who underwent intracapsular total thyroidectomy. Each patient provided his/her written consent to participate in the study. The Faculty of Medicine Ethics Committee approved this study.

Inclusion criteria

- (1) Presence of primary toxic goiter after recurrence or failure of medical treatment.
- (2) Presence of secondary toxic goiter.
- (3) Presence of simple multinodular goiter.

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Exclusion criteria

- (1) Presence of clinically and preoperative biopsy-based evidence of malignant goiter.
- (2) Presence of thyroiditis.
- (3) Presence of recurrent thyroid disease.

Preoperative investigations

- (1) Routine tests for fitness of patient.
- (2) Thyroid function tests: free T3, free T4, and TSH.
- (3) Thyroid imaging: thyroid ultrasound and thyroid scan.
- (4) Pathological assessment: fine needle aspiration cytology (FNAC) when needed.
- (5) Preoperative calcium level and indirect laryngoscopy in all patients.

Operative technique

After proper positioning and sterilization of the patient, a collar incision was made in the lower anterior neck, and after dissecting the subhyoid muscles the thyroid gland was exposed. Delivery of the thyroid lobe and ligation of the middle thyroid vein was executed. The upper pole of the thyroid (medial and lateral) was mobilized, with ligation of the superior thyroid vessels inside the capsule of the thyroid. Ligation of the inferior thyroid veins at the lower pole was also performed. A longitudinal incision was made in an avascular area of the lower part of the thyroid capsule on the middle to distal part of the gland (Fig. 1). This longitudinal incision was extended with a pair of fine scissors until the whole thyroid capsule was opened (Fig. 2). The incised thyroid capsule was reflected off the gland with tissue forceps and the thyroid tissue was then gently moved away from the inside aspect of the thyroid capsule with a sterile tissue peanut, leaving the

Figure 1



A longitudinal incision is made in an avascular area of the lower part of the thyroid capsule on the middle to the distal part of the gland.

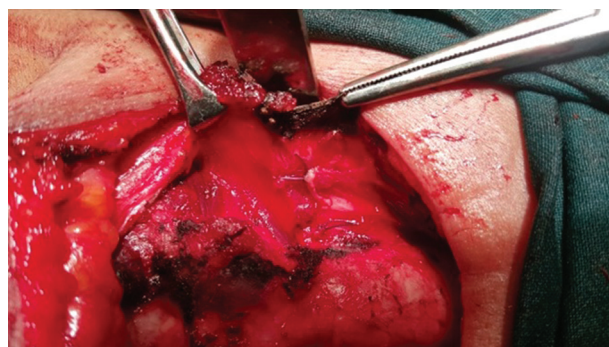
thyroid capsule intact (Fig. 3). The inferior thyroid artery was ligated from the inner aspect of the thyroid capsule with no attempt at searching for or identification of the recurrent laryngeal nerve (RLN) from the outer aspect (Fig. 4). No attempt was made to identify and preserve the parathyroid glands on each side of the thyroid lobe; we preserve them with intact blood supply (Figs 5 and 6). 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.

Figure 2



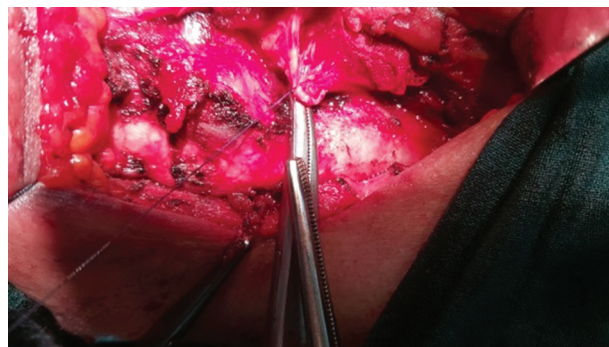
This longitudinal incision is extended with a fine scissors until the whole thyroid capsule is opened.

Figure 3



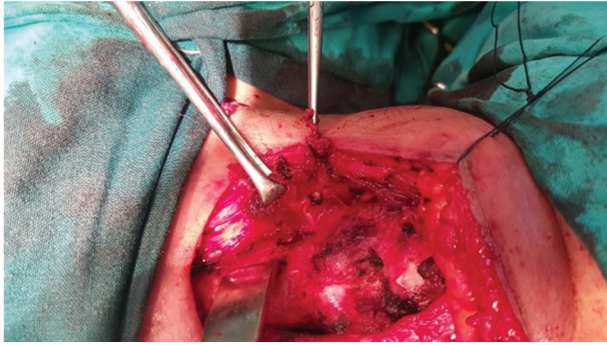
The incised thyroid capsule is reflected off the gland.

Figure 4



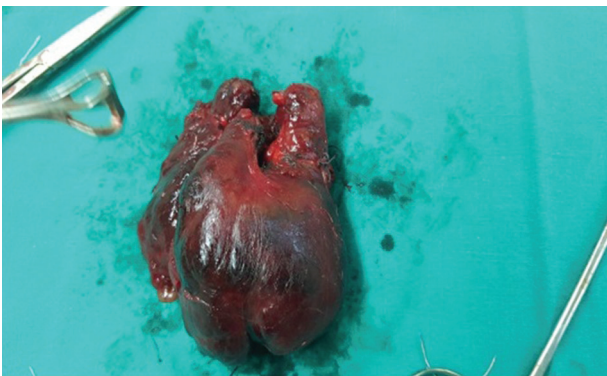
Intracapsular ligation of the inferior thyroid artery.

Figure 5



Total gland excised with remnant part of the thyroid capsule.

Figure 6



Final thyroid specimen.

Results

This study included 50 patients with benign thyroid disease who were candidates for surgical interference. Intracapsular thyroidectomy was performed in all patients. The mean age of the patients studied was 28.8 ± 10.2 years (range: 18–50 years). Thirty patients (60%) were women and 20 (40%) were men. Controlled primary toxic goiter was found in 10 (20%) patients, secondary toxic goiter in 15 (30%) patients, and simple multinodular goiter in 25 (50%) patients (Table 1). Wound complication – that is mild seroma formation – was seen in two (4%) patients in the subcutaneous plane, which recovered within 2 weeks. No patients experienced a change in voice (low pitched or hoarseness) (no external laryngeal nerve or RLN palsy) and no patients developed manifestations of hypocalcemia (hypoparathyroidism) (Table 2). The volume of blood loss was 100 ± 40 ml. The operative time was 60 ± 15 min (Table 3), and the length of hospital stay was 1 ± 0.045 days (Table 4).

Discussion

Thyroid surgery in recent years is generally considered quite safe owing to better preoperative preparation and

Table 1 Personal characteristics of the studied group (N=50)

Personal characteristics	n (%)
Age (years)	
$\bar{X} \pm SD$	28.8 ± 10.2
Range	18–50
Sex	
Male	20 (40)
Female	30 (60)

Table 2 Type of goiter in the studied group (N=50)

Types of goiter	n (%)
Primary toxic goiter	10 (20)
Secondary toxic goiter	15 (30)
Simple multinodular goiter	25 (50)

Table 3 Operative complications in the studied group (N=50)

Complications	n (%)
No complications	48 (96)
Complications	
Wound complication (seroma)	2 (4)
SLN injury (low-pitched voice)	0 (0.0)
Permanent and transient RLN injury	0 (0.0)
Permanent and transient hypoparathyroidism	0 (0.0)

Table 4 Mean \pm SD of blood loss, operative time, and hospital stay in the studied group (N=50)

Studied variables	$\bar{X} \pm SD$
Blood loss intraoperative (ml)	100.0 ± 40
Operative time (min)	60.0 ± 15
Hospital stay (day)	1.00 ± 0.45

proper surgical techniques that keep complications at a minimum (<2–3%) [8]. The traditional technique of bilateral thyroidectomy in benign thyroid disease is still the extracapsular maneuver with its variations and a large spectrum of complications according to the experience of the surgeon.

In this study, no patient developed a complication of RLN injury. The nerve lesion varies from irreversible persistent complication to transient dysfunction with good prognosis of complete recovery from several weeks to 2 years [9,10]. Centers in which both total thyroidectomy and subtotal resection are performed only by experienced endocrine surgeons report rates of RLN palsy that range from 0.5 to 1% [11]. Another study revealed a higher rate of RLN palsy of up to 2.3% after total thyroidectomy [12]. This difference was due to the absence of postoperative RLN palsy on using our new intracapsular technique, which could be attributed to the complete excision of the glandular part from the inside of the capsule without any dissection in the outer surface of the capsule, especially in the lower part where

the inferior thyroid artery and its branches are close to the RLN. Thus, intracapsular thyroidectomy can prevent nerve injury and this technique can be performed by junior staff who perform thyroidectomy occasionally.

Further, in our study no patients developed a complication of transient hypocalcemia or permanent chronic hyperparathyroidism. The risk for permanent hypoparathyroidism after any type of procedure is difficult to estimate from the available data, but a risk of about 9–10% should be expected after total thyroidectomy [12,13], even though lower values of 0.5% have been reported in specialized centers [11]. Trupka and Sienel [14] reported that after thyroidectomy for large multinodular goiter, temporary hypocalcemia requiring calcium replacement occurred in 20% of patients. This usually occurs about 36 h postoperatively. Only up to 3% of patients remained permanently hypocalcemic [14]. This occurred during extracapsular thyroidectomy because of the different anatomical location of the parathyroid glands, which are particularly vulnerable to injury with extracapsular dissection, and due to exposure of the thyroid arteries and its branches as both parathyroid glands derive their blood supply from branches of this artery, which is prevented during intracapsular thyroidectomy with no incidence of parathyroid injury.

The operative time was 60 ± 15 min with our intracapsular thyroidectomy technique. In a German multicenter study, total thyroidectomy took an average of 150 min [10]. This considerable difference in operative time was due to the fact that no time was lost in searching for or identification of the inferior thyroid artery, RLN, and parathyroid glands. Further, the length of hospital stay was 1 ± 0.45 days, and in the study by Dener [15] the length of hospital stay was 2 ± 0.13 days. Patients with an uncomplicated postoperative course can usually be discharged 1 or 2 days after surgery [16]. One point that may be raised against intracapsular thyroidectomy is the rare case where the specimen proves malignant. There will be a need for redo to remove the capsule left behind. The difficulty and outcome in such cases need to be addressed in further studies.

Conclusion

Intracapsular thyroidectomy is an effective and safe method for the management of benign thyroid

disease and an excellent alternative technique for total thyroidectomy that can be performed by junior staff.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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