

**Indications and complications of thyroidectomy in Al-Ramadi teaching hospital**Esmael Saleh<sup>1</sup>, Aamer Fakhree<sup>2</sup>, Raid M Al-Ani<sup>1</sup>**Abstract**

Thyroidectomy is one of the common operations performed worldwide. It is a main option of treatment for different benign and malignant thyroid problems. Despite improvements in procedures have decreased mortality and even and morbidity rates to a minimum; however, postoperative complications remain a major concern among surgeons. We aimed to evaluate the indications and complications of thyroidectomy. A Prospective study was conducted at Al-Ramadi Teaching Hospital/Ramadi city/Iraq during the period from January 2009 to January 2010. There were 130 patients underwent thyroidectomy. A demographic and clinical data for each patient was recorded to assess indications and complications of different types of thyroidectomies. The majority of the patients were females (93%). The most age group affected was 21-30 years (41.54%). Pressure symptoms were accounting for 61.54% of the indications. Thyroid enlargement in euthyroid states (80%) was the common presenting state. Subtotal thyroidectomy (58.46%) was the commonest procedure. Out of 130 patients, 36 patients (27.69%) were suffered from complications. The 2 most common complications encountered in the study were hypocalcemia (61.11%) and recurrent laryngeal nerve palsy (5.38%). In conclusion, subtotal thyroidectomy is a common procedure in our hospital. Compressive complaints were the most common indication. Hypocalcemia and recurrent laryngeal nerve palsy were the 2 most postoperative complications.

**Key words:** Thyroidectomy; Indications; Complications; Hypocalcemia; Vocal cord paralysis; Pressure symptoms

\* Correspondence author: [raedalani2003@yahoo.com](mailto:raedalani2003@yahoo.com)

<sup>1</sup>Al-Ramadi teaching hospital

<sup>2</sup>Department of Surgery, College of Medicine, University of Anbar

Received 04 January 2020, Accepted 1 April 2020, Available online 9 October April 2020

This is article distributed under the terms of the Creative Commons Attribution License

(<http://creativecommons.org/licenses>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Copyright © 2020 RA

**Introduction**

Thyroid disorders are known a common disease in daily practice, including a variety of both benign and malignant thyroid nodules, large thyroid glands (goiters), and overactive thyroid glands. Goiter is an endemic disease in Iraq [1]. Thyroidectomy is the best choice for the

treatment of thyroid gland diseases [2]. Thyroidectomy is indicated in individuals presented with enlargement of thyroid gland with or without nodules include high index of suspicion of malignancy [(hard, firm, rapid growing fixed nodule/s), cervical lymphadenopathy, high-risk lesion on ultrasound imaging, suspicious/positive lesion on FNAC], compressive symptoms, and cosmetic purpose [3, 4]. Surgical procedures have the potential for complications, and thyroidectomy is no exception. Although the complications rate of thyroid surgery has decreasing, but it is still occurring, and these complications are depending on patient condition, pathology of goiter, procedure done and experience of surgeon [5].

The purposes of this study were to reports and determine the indications and complications of thyroidectomy in Ramadi/Al-Anbar.

### **Patients and methods**

This is a prospective study of 130 patients underwent thyroidectomies in the Al-Ramadi Teaching Hospital in Ramadi city/Iraq between January 2009 and January 2010. The study was designed to assess the indications and complications of thyroidectomy in patients with benign and malignant thyroid diseases.

A complete medical history and physical examination were recorded; preoperative investigations include thyroid hormone profile, serum calcium level, and ultrasound of the neck were done. Plain radiography of the neck and/or neck computed tomography was done in certain selected cases. The fine-needle aspiration cytology was performed in all patients with thyroid nodules. Indirect laryngoscopic or fiber-optic nasolaryngoscopy examination of the vocal cords was done for all patients.

All our thyrotoxic patients were rendered euthyroid at the time of surgery. They were prepared in outpatient clinics and the preparation was accomplished with carbimazole and propranolol.

### **Surgical procedures**

All patients were operated on by experienced general surgeons at our hospital using standard surgical techniques through a collar incision. All operations (subtotal thyroidectomy, near total thyroidectomy, total thyroidectomy, and lobectomy) were performed under general anesthesia with an endotracheal tube. Drains were used in all of the operations. Dexamethasone was given in a single dose (8 mg intravenously) to the patients with recurrent diseases. Postoperative evaluation: vocal cord examination was done at extubating in all patients, and laryngoscopic examination was done in suspicious cases. RLN palsy was defined as the presence of immobility or decreased movement of the vocal cords at laryngoscopic examination. For the purpose of the study, a persisting vocal cord dysfunction after six months was considered a permanent paralysis.

A temporary hypoparathyroidism was defined as a total serum calcium level less than 8.5 mg/dl associated with symptoms of tetany, muscle spasm and paresthesia that resolved within six months, if hypoparathyroidism persisted for more than six months, it was defined as a permanent hypoparathyroidism.

### **Statistical analysis**

Chi square test was used for statistical analysis for comparing the results of the patients, with or without postoperative complications. The data were analyzed using SPSS version 17.0. The study was approved by Department of Surgery/College of Medicine/ University of Anbar.

### **Results**

One hundred thirty patients with goiter were undergoing a different type of thyroidectomy. There were 121 females (93.08%) and 9 males (6.92%), the age ranged from 16-60 years with a mean age of  $32.3 \pm 10.8$  years. 54 patients (41.54%) were between 21-30 years and the least age group were between 51-60 years (10, 7.69%) Table 1.

Eighty-one (62.31%) of patients were from urban and 49 (37.69%) from rural areas. The most common complication was transient hypocalcemia (51.3%) and the least Permanent unilateral RLN palsy and hematoma 2.5% for each Table 2.

The most common indications for thyroidectomy was pressure symptoms (n=80, 61.54%), most of our patients were euthyroid before surgery (n=104, 80%), and only 12 of our patients with retrosternal goiter Table 3.

Most of our patients with multinodular goiter (n=109, 83.84%) Table 4. Subtotal thyroidectomy was performed for 76 patients (58.46%), only in 25 (19.23%) ligation of ITA from main trunk was performed, and in 89 (68.46%) of surgeries identification and preservation of RLN was not done Table 5. There were statistically significant difference regarding age (age group 21-30, and 41-50), male gender, recurrent goiter, hypothyroid state preoperatively, retrosternal goiter, total thyroidectomy, ligation of ITA from main trunk, Ligation of STA, bilateral identification and preservation of RLN Tables 1, 3-5.

**Table 1.**

The age and gender of 130 thyroidectomies patients.

Character		Total No. 130 No. %	With complication 36 No. %	Without complications 94 No. %	P value
<b>Age</b>	11-20 years	14(10.77%)	6(16.67%)	8(8.51%)	0.11
	21-30 years	54(41.54%)	7(19.44%)	47(50%)	0.00
	31-40 years	35(26.92%)	10(27.78%)	25(26.59%)	0.89
	41-50 years	17(13.08%)	9(25%)	8(8.51%)	0.006
	51-60 years	10(7.69%)	4(11.11%)	6(6.38%)	0.22
<b>Gender</b>	Male	9(6.92%)	1(2.78%)	8(8.51%)	0.08
	Female	121(93.08%)	35(97.22%)	86(91.49%)	0.66

**Table 2.**

The type of complication in 130 thyroidectomies patients.

Type of complication	Number	Frequency
Transient hypocalcemia	20	51.3%
Permanent hypocalcemia	2	5.1%
Transient unilateral RLN palsy	6	15.5%
Permanent unilateral RLN palsy	1	2.5%
SLN palsy	3	7.7%
Hematoma	1	2.5%
Seroma	4	10.3%
Stich granuloma	2	5.1%
Total	39	100%

**Table 3.**

Preoperative characteristics of 130 thyroidectomies patients.

Character		Total No. 130 No. %	With complication 36 No. %	Without complications 94 No. %	P value
<b>Indications</b>	Pressure symptoms	80(61.54%)	23(63.89%)	57(60.38%)	0.71
	Hyperthyroidism	18(13.85%)	4(11.11%)	14(14.89%)	0.43
	Cosmetic reasons	9(6.92%)	1(2.78%)	8(8.51%)	0.083
	Hard texture	3(2.31%)	1(2.78%)	2(2.13%)	0.65
	Pressure symptoms + Recurrent cyst	6(4.62%)	0(0%)	6(6.38%)	
	Pressure symptoms + Hyperthyroidism	1(0.77%)	1(2.78%)	(0%)	
	+ve FNAC	5(3.85%)	1(2.78%)	4(4.25%)	0.7
	Recurrence	5(3.85%)	4(11.11%)	1(1.06%)	0.004
	Hard texture +RLN palsy	1(0.77%)	0(0%)	1(1.06%)	
	Recurrent cyst	2(1.54%)	1(2.78%)	1(1.06%)	0.31
<b>Preoperative thyroid status</b>	Euthyroid	104(80%)	25(69.44%)	79(84.04%)	0.22
	Hyperthyroidism	19(14.62%)	7(19.44%)	12 (12.76%)	0.22
	Hypothyroidism	7(5.38%)	4(11.11%)	3(3.19%)	0.03
<b>Retrosternal</b>	Yes	12(9.23%)	6(16.67%)	6(6.38%)	0.02
	No	118(90.77%)	30(83.33%)	88(93.62%)	0.4

**Table 4.**

The relationship between types of goiter and the complications of 130 thyroidectomies patients.

Histopathology	Total number 130	With complication 36	Without complication 94	P value
MNG	109(83.84%)	26(72.22%)	83 (88.3%)	0.2
Thyroiditis	10(7.69%)	6(16.67%)	4(4.255%)	0.005
Graves' Disease	3(2.31%)	2(5.55%)	1(1.06%)	0.059
Malignant	8(6.15%)	2(5.55%)	6(6.38%)	1

**Table 5.**

The relationship between operative techniques and the complications of 130 thyroidectomies patients.

Operative Techniques		Total No. 130 No. %	With complication 36 No. %	Without complications 94 No. %	P value
<b>Thyroid procedures</b>	Subtotal thyroidectomy	76(58.46%)	16(44.44%)	60(63.83%)	0.054
	Near total thyroidectomy	17(13.08%)	3(8.33%)	14(14.89%)	0.14
	Total thyroidectomy	26(20%)	14(38.89%)	12(12.76%)	0
	Lobectomy	11(8.46%)	3(8.33%)	8(8.51%)	0.80
<b>Ligation of ITA from main trunk</b>	No	105(80.77%)	19(52.78%)	86(91.48%)	0.002
	Yes	25(19.23%)	17(47.22%)	8(8.51%)	0
<b>Ligation of STA</b>	Individual branches	111(85.38%)	26(72.22%)	85(90.42%)	0.15
	Mass ligation	19(14.61%)	10(27.78%)	9(9.57%)	0.005
<b>Identification and preservation of RLN</b>	Unilateral	30(20.08%)	11(30.55%)	19(20.21%)	0.12
	Bilateral	11(8.46%)	5(13.89%)	6(6.38%)	0.07
	None	89(68.46%)	20(55.55%)	69(73.40%)	0.13

## Discussion

Thyroidectomy is one of the main forms of treatment for thyroid gland diseases and it is a very common therapeutic procedure worldwide and is performed by surgeons with varied training and backgrounds [6]. The indications for thyroid surgery in the world vary with the prevalence of the presentation and pathology of thyroid disorders from country to other [2], the current indications for surgery are compression-induced symptoms, malignant conditions, suspected malignancy, hyperthyroidism and Cosmesis [7], we found that multi

nodular goiter (n=69) is at the top list of indications followed by solitary nodule (n=21) which was similar to the prior study [5, 8].

Iraq is an endemic area for goiter, mostly in northern and middle parts [1] because of the lack of iodine in soil and in the water supply. In addition, that most of our patients were females as compared to males: a finding consistent with many previous studies [5, 6, 9-13].

The highest numbers of our patients were in the third decade, which was differ from previous study [12], who found that the higher age group affected was 40-49 years. This was attributed to the difference between the studied samples.

In the present study, urban patients were more than rural patients, which may be due to urban people are generally more aware of the disease and more easily reaching hospital in addition the care of cosmetic reasons for this group of people may be another factor. Surgical procedures have the potential for complications, and thyroidectomy is no exception [15]. The most common complications in thyroid gland surgery that bother and concern the surgeon are RLN injury and hypocalcemia (6,16,17). There are various factors affecting post-thyroidectomy complications (5,6,10,14) including, the type of pathology, surgical technique and surgeons' experience. Hypoparathyroidism is the most common complication encountered in our study and RLN injury were within the range of prior studies: 0.6-38% and 1-10%, respectively [14-22].

Hypoparathyroidism is in most cases is a transient and may be caused by injury, devascularization or removal of a gland, although other non-mechanical factors may be associated with the development of hypocalcemia, such as hemodilution, hungry bone syndrome, medications and general anesthesia [10]. We were somewhat surprised that the indication of surgery for malignancy was not found to influence the rate of hypocalcemia. While other studies have found that thyroidectomy for malignancy is associated with higher rates of postoperative hypocalcemia [5]. As these patients with malignancy are more likely to undergo TT, the exact factor may be the extent of surgery.

Permanent hypocalcemia occurs with a lower incidence [10]. Routine postoperative calcium and vitamin D supplementation therapy might be useful for the prevention of symptomatic hypocalcemia after thyroidectomy. More incidence of hypocalcemia was observed in our study when ligation of inferior thyroid artery (ITA) bilaterally in comparison when individual ligation of its branches nearby the gland. This is because it is an end artery and is considered as the main blood supply and, this will cause devascularization of parathyroid glands.

RLN injuries are disastrous complications and potentially debilitating, especially those patients with bilateral injury. Factors affecting the incidence of RLN injury are: indication for surgery (being more common in malignant disease), second surgery, type of procedure,

identification during operative field, using intraoperative monitoring devices and surgeon experience [5]. In our study the RLN injury was occurred in 6 cases (4.6 %) all of them were unilateral, which is inconsistent with the findings observed in previous study [9], all occur in patients submitted for TT and NTT. We attributed this to the identifying and exposing of RLN in most TT, NTT and total lobectomy. Two (1.53%) of RLN were permanent RLN injury. It was unilateral in both cases and they were needing a tracheostomy. One of the patients with a recurrent goiter and have a deep hematoma requiring exploration of the wound and the other case was malignancy with sever adhesion; both of them needed a tracheostomy.

The overall postoperative complication rate in this study was 27.69%, one of limitation of the study that recurrence of thyroid disease and hypothyroidism could not be assessed in all patients as the study period was not enough. This rate of complications was lower than the prior study [5].

There are different opinions concerning the surgical procedure options for the goiter, this disagreement about STT versus TT or NTT. Many studies have adopted TT or NT for goiter especially for MNG [9], conversely a lot of studies claimed an increased number of complications in TT and NTT as the more extensive procedures are associated with greater number of complications but the recurrence rate is low [5, 23]. The STT was the most usual surgical thyroid procedure performed in Ramadi Teaching Hospital, (n=78, 58.46%) than TT for a variety of causes we think might be: Because of operative complications are less than TT, no need for lifelong thyroxin replacement as that long-term euthyroid state can be achieved, in addition to poor tolerance of our patients to medications. It is well known and mentioned in the literatures that TT, reoperation, mass ligation of STA, ligation of ITA from its main trunk are major risk factors for development of complications which is inconsistent with our study [5].

In our study, the SLN was injured at a rate of 1.54%, The rates of trauma to SLN are highly variable in the literature, and can be as high as 58% [24]. There may be undetectable nerve injury in our study as the majority of our patients were not professional voice users .

In our study, we observed one patient (0.77%) with deep hematoma requiring exploration of the wound and tracheostomy. This complication is consistent with prior study [5].

There is a belief that usage of drains following thyroidectomy can prevent seroma formation. However, the prior meta-analysis study [25] concluded that there were no statistically significant differences in the incidence of neck hematoma/seroma in those with usage of drains or those without drains. In a recent study reported that increasing age of the patient, high body mass index, and low level of ionized calcium are a predisposing factor for seroma formation [26]. Stitch granuloma was observed in one patient and we found that the suture material used was catgut as this suture causes considerable inflammatory reaction.

Wound infection is not a common complication. Fortunately, the infectious complications after the thyroid surgery were not observed in our study. This is simply interpreted by the fact that thyroidectomy is a clean surgery and infection rate should be not more than 1% . We didn't observe thyroid storm probably because of adequate preparation of our thyrotoxic patients. Also, other infrequent complications e.g. Horner's syndrome, chylous fistula etc..... we're not observed in our study.

Postoperative mortality with thyroidectomy has become an extremely unusual complication [27]. Postoperative death was also not observed in our study, and the reason may be attributed to good selection and adequate preparation of our patients and also the age of upper limit was not more than 60 years as the medical complications in these patients are less in comparison to older age groups.

Obvious limitations of our study are the following: small sample size, short study period, lack of previous documentations and new technologies like frozen section biopsy, nerve monitoring studies and endoscopic video-assisted surgery. In spite of low complication rates of these new technologies 90-93, complication rates in the present study still within acceptable limits. We suggest further study to compare the complication rate between the conventional thyroid procedures with the endoscopic video-assisted thyroidectomies.

### **Ethical Approval**

The study was approved by the Ethical Committee.

### **Conflicts of Interest**

The author declare that he has no competing interests.

## References

1. Al-Hashimi HM. Thyroid nodules in Iraq. *Postgrad Med J* 1972;48(556):80–2.
2. Röher H-D, Schulte K-M. History of thyroid and parathyroid surgery. In: *Surgery of the Thyroid and Parathyroid Glands*. Springer; 2007. p. 1–12.
3. Kaplan E, Angelos P, Applewhite M, Mercier F, Grogan RH. Surgery of the thyroid. In: *Endotext* [Internet]. MDText. com, Inc.; 2015.
4. Bartsch DK, Luster M, Buhr HJ, Lorenz D, Germer C-T, Goretzki PE. Indications for the surgical management of benign goiter in adults. *Dtsch Arztebl Int* 2018;115(1–2):1.
5. Neto ME, Tagliarini JV, López BE, et al. Factors influencing thyroidectomy complications. *Braz J Otorhinolaryngol* 2012;78(3):63–9.
6. Chahardahmasumi E, Salehidoost R, Amini M, et al. Assessment of the early and late complication after thyroidectomy. *Adv Biomed Res* 2019;8.
7. Shuja A. History of thyroid surgery. *Prof Med J* 2008;15(02):295–7.
8. Sun GH, DeMonner S, Davis MM. Epidemiological and economic trends in inpatient and outpatient thyroidectomy in the United States, 1996–2006. *Thyroid* 2013;23(6):727–33.
9. Al Janaby SH. Total Thyroidectomy versus Near Total thyroidectomy in Surgical Management of Patients of Multinodular Goiter. *Med J Babylon* 2014;11(1):235–40.
10. Handoz AAH, Aeeewis AQ. The incidence of post-thyroidectomy hypocalcemia in Al-Diwaniyah Teaching Hospital, Iraq. *Int J Res Pharm Sci*. 2018;9(4):1605–10 .
11. Yousif, N.G. Fibronectin promotes migration and invasion of ovarian cancer cells through up-regulation of FAK–PI3K/Akt pathway. *Cell Biol Int* 2014;38: 85-91.
12. Ghadhban BR. Incidence of differentiated thyroid carcinoma in multinodular goiter patients. *Int J Surg Open*. 2018;15:18–24 .
13. Benbakh M, Abou-elfadl M, Rouadi S, Abada R-L, Roubal M, Mahtar M. Substernal goiter: Experience with 50 cases. *Eur Ann Otorhinolaryngol Head Neck Dis* 2016;133(1):19–22.
14. Huang C-F, Jeng Y, Chen K-D, Yu J-K, Shih C-M, Huang S-M, et al. The preoperative evaluation prevents the postoperative complications of thyroidectomy. *Ann Med Surg*. 2015;4(1):5–10 .
15. Reeve T, Thompson NW. Complications of thyroid surgery: how to avoid them, how to manage them, and observations on their possible effect on the whole patient. *World J Surg*. 2000;24(8):971–5 .
16. Berri T, Houari R. Complications of thyroidectomy for large goiter. *Pan Afr Med J*. 2013;16 .
17. Shiryazdi SM, Kargar S, Afkhami-Ardekani M, Neamatzadeh H. Risk of postoperative hypocalcemia in patients underwent total thyroidectomy, subtotal thyroidectomy and lobectomy surgeries. *Acta Med Iran*. 2014;206–9.
18. Christou N, Mathonnet M. Complications after total thyroidectomy. *J Visc Surg* 2013;150(4):249–56.
19. Agarwal G, Aggarwal V. Is total thyroidectomy the surgical procedure of choice for benign multinodular goiter? An evidence-based review. *World J Surg* 2008;32(7):1313.
20. Jiang Y, Gao B, Zhang X, et al. Prevention and treatment of recurrent laryngeal nerve injury in thyroid surgery. *Int J Clin Exp Med* 2014;7(1):101.

21. NG Yousif, FG Al-Amran, N Hadi, J Lee, J Adrienne. Expression of IL-32 modulates NF- $\kappa$ B and p38 MAP kinase pathways in human esophageal cancer. *Cytokine* 2013;61(1):223-227.
22. Edafe O, Antakia R, Laskar N, Uttley L, Balasubramanian SP. Systematic review and meta-analysis of predictors of post-thyroidectomy hypocalcaemia. *Br J Surg* 2014;101(4):307–20.
23. Al-Hakami HA, Al Garni MA, Malas M, Abughanim S, Alsuraihi A, Al Raddadi T. Surgical Complications After Thyroid Surgery: A 10-Year Experience at Jeddah, Saudi Arabia. *Indian J Otolaryngol Head Neck Surg* 2019;71(1):1012–7.
24. Potenza AS, Araujo Filho VJF, Cernea CR. Injury of the external branch of the superior laryngeal nerve in thyroid surgery. *Gland Surg* 2017;6(5):552.
25. Sanabria A, Carvalho AL, Silver CE, Rinaldo A, Shaha AR, Kowalski LP, et al. Routine drainage after thyroid surgery—A meta-analysis. *J Surg Oncol* 2007;96(3):273–80.
26. Ramouz A, Rasihashemi SZ, Daghigh F, Faraji E, Rouhani S. Predisposing factors for seroma formation in patients undergoing thyroidectomy: Cross-sectional study. *Ann Med Surg* 2017;23:8–12.
27. Cernea CR, Brandao LG, Hojaj FC, De Carlucci D, Montenegro FLM, Plopper C, et al. How to minimize complications in thyroid surgery? *Auris Nasus Larynx* 2010;37(1):1–5.