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Evaluation of Postoperative Complications of Total Thyroidectomy

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Abstract:

Context: Total thyroidectomy is choice for the treatment of differentiated thyroid carcinoma DTC). In order to lower the morbidity rates, total thyroidectomy is also suggested in recent years for benign diseases. The major complications associated with thyroidectomy include injury to the recurrent laryngeal nerve, damage to the parathyroid glands and hypocalcemia, which have the potential to be lifelong & costly issues for a patient. So the aim of study was to find out the early and intermediate post-operative complications of total thyroidectomy. **Methods:** This is a longitudinal study carried on 30 patients who underwent total thyroidectomy in the Department of Surgery and ENT of Rrangpur Medical College hospital. Detailed analysis of the patients who had underwent total thyroidectomy were done regarding investigations, diagnosis and indication for surgery, occurrence of individual complications, patient outcome, duration of stay and follow up. All the information was recorded in pre tested questionnaire. **Results:** Among 30 patients, within 40-60 years, 15(50%) patients were belonged. Twenty eight (93.3%) patients were females; two patients (6.7%) were male. Out of 30 patients, 18 patients (60%) developed complications & among them 5 patients (16.7%) developed multiple complications & all 3 cases of papillary carcinoma developed one or more complications. In case of multinodular goiter complications rate was 60%. Voice change (40%) & temporary hypocalcaemia (36.7%) were the most common complications developed after the procedure. Other complications were superior laryngeal nerve palsy (23.3%), temporary recurrent laryngeal nerve palsy (13.3%), neck hematoma (3.3%), respiratory obstruction (3.3%), temporary hypocalcaemia plus recurrent RLN palsy (6.7%), temporary hypocalcaemia plus SLN palsy (6.7%), airway obstruction with hematoma (3.3%). **Conclusion:** In comparison with other studies, complication rates were higher in our study. But different complication rates were found in different studies and small scale studies showed higher complications rate than larger scale study. Also, as lack of advanced facilities, some of complications were assessed by subjective assessment & it might be a cause of over expressed results.

Indexing words: Total Thyroidectomy, Multinodular Goiter, Differentiated Thyroid Cancer, Recurrent Laryngeal Nerve Injury.

Introduction:

Neoplastic, inflammatory and endocrine abnormalities of the thyroid gland are extremely common, affecting approximately 11% of the general population.[1] Total thyroidectomy is generally reserved for patients with thyroid malignancy, toxic thyroid disease (thyrotoxicosis or toxic multinodular goiter), or clinically significant goiter. The major postoperative complications include hemorrhage, wound infection, hypocalcemia, respiratory obstruction, thyroid storm, hypoparathyroidism and laryngeal nerve injuries.[2]

Now, there is a change in a surgical practice from subtotal thyroidectomy to total thyroidectomy for benign thyroid diseases.[3] Though near total thyroidectomy has been advocated by some surgeons, it has been proposed by majority that total thyroidectomy is the treatment of choice in patients with differentiated thyroid cancer (DTC).[4,5]

Compared to thyroid surgery for benign thyroid disease, complication rates after thyroid surgery for malignant thyroid disease have been reported higher in some studies, while some series have reported no significant difference.[6]

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Complications such as bleeding, hypocalcaemia and Recurrent Laryngeal Nerve Injury (RLNI) represent nearly half of all the complications after thyroid surgery.[7]

The right sided nerve is at higher risk of injury due to its anatomical variation compared to the left side. In addition to the hoarseness that occurs with unilateral RLNI, bilateral RNLI leads to dyspnea and often life threatening glottal obstruction.[8,9] Mechanism of injury to the nerve includes complete or partial dissection, traction, contusion, crushing, thermal damage, missed placed ligature or compromised blood supply.[10]

Voice disorders after thyroid surgery are generally transient but sometimes permanent. These usually occur as a result of a nerve lesion (recurrent or external laryngeal nerve).[11,12,13] The causes of voice disorders without RLNI are multiple, including external laryngeal nerve injury; cricothyroid muscle injury; large laryngotracheal skeleton dissection, specially when the infrahyoid muscles are sectioned; and orotracheal intubation.[14]

Hypocalcaemia after total thyroidectomy is a potential early complication. The majority of cases are secondary to temporary hypoparathyroidism, with recovery in three weeks to six months. However upto33% of patients experience permanent hypoparathyroidism.[15]Transient hypocalcaemia ranges from 0.3% to 49%, and that of permanent hypocalcaemia ranges from 0% to 33%.[16]

Airway complication is a common postoperative complication encountered after thyroidectomy. Tracheomalacia is the most common airway complication. Others are laryngeal edema. RLN palsy and hematoma.[17] The incidence of post surgical neck hematoma ranges from 0.3% to 1.7%.[18,19]

Total thyroidectomy has been accepted as current surgical therapy for benign and malignant thyroid disorders. So it is essential to assess the safety of total thyroidectomy.

Methods:

This is a longitudinal study carried out on 30 patients in the Department of Surgery & ENT, Rangpur Medical College Hospital, Rangpur, Bangladesh from 13th June, 2018 to 13th December, 2018 a period of 6 (six) months.

All patients were selected purposively according to inclusion and exclusion criteria who underwent total thyroidectomy procedure for different thyroid pathologies.

Apart from routine investigations, the commonly performed special investigations done before total thyroidectomy were - thyroid function test (100%), indirect laryngoscopy (100%), FNAC of thyroid swelling (96.7%), USG of the Neck (53.3%) and Thyroid autoantibodies (6.7%). All of the patients were euthyroid before surgery and all patients had normal Vocal Cords.

Patients with RLN palsy diagnosed preoperatively by IDL examination, patients with hypoparathyroidism, patients with h/o previous thyroid surgery and patients with undifferentiated thyroid cancer are excluded.

Each of the complications was tried to assess by both subjective and objective assessment.

After being discharged, every patient was followed up weekly upto one month over phone and at their follow up visits.

The researchers were duly careful about ethical issue related to a scientific study. Detailed information regarding preoperative evaluations, operation notes, occurrence of postoperative complications were obtained in each cases. Collected data was classified, edited, coded & entered into the computer.

Data were analyzed with using computer software SPSS (Statistical Package for Social Sciences) version-20.

Results:

In the study, 50% patients were belonged within 40-60 age group (Table 1).

Table 1: Age distribution of patients (n=30)

Age group (in year)	No of Patients	Percentage
<20	04	13.3%
20 - 40	10	33.3%
40 - 60	15	50%
>60	01	3.3%
Total	**30**	**100%**

Out of 30 cases, 28 (93.3%) patients were female and only 2 (6.7%) cases were male (Table 2).

Table 2: Sex distribution of patients (n=30)

Sex of the patients	No of Patients	Percentage	p-value
Female	28	93.3%	
Male	02	6.7%	.035
Total	**30**	**100%**	

Out of 30 patients 25 patients (83.3%) presented with multinodular goiter (Table 3).

Table 3: Types of thyroid disease for which total thyroidectomy was carried out (n=30)

Types of thyroid disease	No of patient	Percentage	p-value
Multi nodular goiter	25	83.3%	
Papillary carcinoma of thyroid	03	10%	
Solitary thyroid nodule (benign according to FNAC)	02	6.7%	.041
Total	**30**	**100%**	

Voice change (40%) and temporary hypocalcaemia (36.7%) were the most common complications developed after the procedure (Table 4).

Table 4: Types of complications developed after total thyroidectomy procedure (n=30).

Name of complication	No of patient	Percentage	p-value
Voice change	12	40%	
Temporary hypocalcaemia	11	36.7%	
Superior laryngeal nerve palsy (SLNP)	07	23.3%	
Temporary RLN palsy	04	13.3%	
Neck hematoma/ Hemorrhage	01	3.3%	
Respiratory obstruction	01	3.3%	0.76
Temporary hypocalcaemia + RLN palsy	02	6.7%	
Temporary hypocalcaemia + SLN palsy	02	6.7%	
Airway obstruction + Hematoma	01	3.3%	

Out of 30 patients, 18 patients (60%) developed complications and among them 5 patients (16.1%) developed multiple complications and all 3 cases of papillary carcinoma develop one or more complications (Table 5).

Table 5: Disease complication correlation (n=30)

Disease of thyroid gland	Total number of patients	Number of patient developed complications	Nature of complication	
			Single	Multiple
Multinodular goiter	25(83.3%)	15(60%)	11(44%)	4(16%)
Papillary carcinoma of thyroid	03(10%)	03(100%)	02(66.7%)	01(33.3%)
Solitary thyroid nodule	02(6.7%)	-	-	-
Total	**30(100%)**	**18(60%)**	**13(43.3%)**	**05(16.7%)**

Though 4 (13.3%) developed unilateral RLN palsy, no one developed bilateral RLN palsy. Among the 7 patients (23.3%) of superior laryngeal nerve (SLN) palsy, 5 cases were due to surgery for multinodular goiter and 2 cases due to surgery for papillary carcinoma. Among the 11 cases of temporary hypocalcaemia, 8 patients due to surgery for multinodular goiter and 3 patients due to surgery for papillary carcinoma. Overall incidence of complication were higher in cases of malignant thyroid disease than benign thyroid disease. No complication was detected in solitary thyroid nodule.

Table 6: Incidence of complications for benign and malignant thyroid disease (n=30)

Disease of thyroid gland	No of patient	Type of complication	Percentage of total No. of Patients
Multinodular goiter	25	Voice change	36%
		Temporary hypocalcaemia	32%
		Superior laryngeal nerve (SLN) palsy	20%
		Temporary RLN palsy	16%
		Respiratory obstruction	4%
		Neck hematoma	4%
Papillary carcinoma of thyroid gland	03	Temporary hypocalcaemia	100%
		Superior laryngeal nerve (SLN) palsy	66.7%
Solitary thyroid nodule (benign)	02	Voice change	66.7%

Discussion:

The present study was conducted to evaluate the outcomes of total thyroidectomy in 30 patients in the department of Surgery & ENT of Rangpur Medical College Hospital (RpMCH) during the period of 6 months from 13th June 2018 -13th December 2018.

In this study most common age group was 41-60 years (Table 1), and 28 patient (93.3%) were female (Table 2). Bhattacharyya and Fried in a study reported that mean patient age was 48.3 years and 81.8% of the patients were female among 517 patients who underwent total thyroidectomy as a primary procedure.[20] But Mridul et al. in a study conducted on Assam, India showed that, the commonest age group of patients who underwent different thyroidectomy procedure was 31-40 years, and majority of patients were female 90%.[21] In our study, complications were developed in 18 patients (60%). Among them, 5 patients developed multiple complications (16.7%). In cases of benign thyroid condition (MNG and solitary thyroid nodule) incidence of complication was 55.6% and in malignancy it was 100%. So, in our study, all of the carcinoma patients developed one or more complications. In case of multinodular goiter incidence was 60% and in case of solitary benign nodule no complication occured. Among 5 patients who developed multiple complications, four patients were operated for MNG (16%) and one patient for papillary carcinoma of thyroid (33.3%) (Table 5). Rehamet.al. on a study showed that, overall complications rate after total thyroidectomy was 91.2%.[22]

Antonio et al. showed that the incidence of complications after total thyroidectomy for MNG was 21%[23]. Meehmet et al. showed that the incidence of complications after total thyroidectomy for differentiated thyroid cancer was 22%[33]. In comparison among different studies, it was seen that, complications rate was varied from study to study and complication rate was higher in small scale study than larger scale study. As our study was a small scale study it showed higher rates of complications.

The present study showed that voice change 40% and temporary hypocalcaemia (36.7%) were the most common complications after the procedure. Other complications were superior laryngeal nerve palsy (23.3%), temporary RLN palsy (13.3%), neck hematoma/hemorrhage (3.3%), respiratory obstruction (3.3%), temporary hypocalcaemia with RLN palsy (2/30) (6.7%), temporary hypocalcaemia with SLN palsy (6.7%), airway obstruction plus hematoma (3.3%), (Table 4.). No patient developed seroma, wound infection or thyrotoxic storm. There was no mortality after the procedure. Voice change was the most common complications in our study (40%). In our study, we utilized subjective voice assessment according to patient's complaints postoperatively who had normal voice preoperatively. Page et al. studied on subjective voice assessment after total thyroidectomy procedure and found voice change in 49%[25]. Similarly during a prospective

study of 54 patients, 30% patients reported early subjective voice changes and 14% reported late (3 months) changes.[26]

AII patients who had voice changes were assessed by indirect laryngoscopy or fiberoptic laryngoscopy on the early postoperative period. Four patients who were suspected for recurrent layngeal nerve (RLN) palsy due to hoarseness of voice & dysphagia, found unilateral RLN Palsy on laryngoscopy. Interestingly all four unilateral RLNI was happened with the patients operated for MNG.

Antonio et al. in their study showed the incidence of recurrent laryngeal nerve injuries were 8.6% which was conducted on patients with MNG who underwent total thyroidectomy procedure.[23] Reham et al. at a study showed only RLN palsy in two cases (5.9%) and RLN palsy with hypocalcaemia in four cases (11.8%).[22] A study conducted by Hazem et al. showed transient URLN palsy in two cases (14.2%) and transient BRLN palsy in two cases (14.2%).[27]

In this study, incidence of superior laryngeal nerve palsy was 23.3% (Table 4) and it was the main cause of voice change (58.3% in total patients).

Several studies have suggested that majority of post-thyroidectomy voice complaints results from trauma to the external branch of superior laryngeal nerve (EBSLN), with reported rates ranging from 12 to 58%.[28,29,30]

In our study, one patient developed airway obstruction due to tracheomalasia (3.3%). This patient was operated for huge multinodular goiter. Tracheostomy was needed & it was done on 1St POD. Ayandipo et al. studied on airway complications and outcome after thyroidectomy. They showed hematoma in 4 (0.8%) patients, tracheomalasia in 27(5.3%) patients.[I7] Bhattacharyya and Fried. showed incidence of hematoma was 1.0%.[20] In our study temporary hypocalcaemia was developed in 11 patients (36.7%).

In the present study, 8 patients with multinodular goiter (32%) and 3 patients with papillary carcinoma of thyroid (100%) developed symptomatic hypocalcaemia. Arumugan et al. found postoperative hypocalcaemia approximately 35%. Joon et al showed that, transient symptomatic or biochemical hypocalcaemia developed in 62 patients (55.3%) and permanent hypocalcaemia in 2 patients (1.8%).[31]

This study was done within a short period of time, so sample size was small. As there was lack of facilities of high-tech technology, some complications could only be assessed by subjective assessment.

Conclusion:

Complication rates after total thyroidectomy has been well studied for many years at different centers. It seems that it varies from center to center, but total thyroidectomy is accepted worldwide as a choice of procedure for malignant thyroid disease, MNG & some other benign disease. In the present study complication rates were higher than some other studies. If we take consideration of the limitations of the present study this rate could be well judged.

References :

1. Canaris GJ, Manowitz NR, Mayor G. The Colorado Thyroid Disease Prevalence Study. Arch Intern Med 2000; 160:526-534.
2. Gostu CS. Mekala AHB, Konati V. A study of early post-operative complications of thyroid surgery and their management. IOSR-JDMS.2015; 14:4(1).
3. Tezelman S. Borucu I, Senyurek Giles Y, Tunca F, Terzioglu T. The change in surgical practice from subtotal to near-total or total thyroidectomy in the treatment of patients with benign multinodular goiter. World J Surg. 2009; 33:400-5.
4. Dackine AP, Zeiger M. Extent of surgery for differentiated thyroid cancer. Surg Clin North Am.2004; 84:817-32.
5. Makay O, Unalp O, Icoz G. Completion thyroidectomy for thyroid cancer. AetaChirBeIg.2006; 106; 528-31.
6. Osmolaski A, Frenkiel Z, Osmolaski R. Complications in surgical tr xiv thyroid diseases. Otolaryngol Pol.2006; 0:165-70.
7. Kerinoglu RS, Gozalan U, Kana NA. Complications of thyroid surgery:Analysis of 1159 cases. IJMMS.2013; 1:35-8.
8. Jatzko GR, Lisborg PH, Muller MG, Wette VM. Recurrent nerve palsy after thyroid operations-principal nerve identification and a Literature review. Surgery 1994 Feb; 115(2):139-144.
9. Fewins J. Simpsons CB, Miller FR. Complications of thyroid and parathyroid surgery. Otolaryngol Clin North Am. 2003 Feb; 36(1):189-206,x.

10. Myssiorek D. Recurrent laryngeal nerve paralysis; anatomy and etiology. Otolaryngol Clin North Am.2004; 37:25-44.

11. Lamade W, Renz K, Willeke F, Klar E, Herfarth C. Effect of training on the incidence of nerve damage in thyroid surgery. Br J Surg.1996; 86:38-91.

12. Lo CY, Kwok KF, Yuen PW. A prospective evaluation of recurrent laryngeal nerve paralysis during thyroidectomy. Arch Surg.2000; 135:204-7.

13. Jonas J, Bahr R. Neuro monitoring of the external branch of the superior laryngeal nerve during thyroid surgery. Am J Surg.2000; 179:234-6.

14. Cyril P. Rody Z, Aurelie b. Subjective voice assessment after thyroid surgery: A prospective study of 395 patients. Indian J Med Sci.2001 Aug; 61;8.

15. Rosato L, Avenia N, Bernante P. Complications of thyroid surgery: analysis of a multicentric study on 14,934 patients operated on in Italy over 5 years. World J Surg. 2004; 28:271-6.

16. Randolph GW, Surgery of the thyroid and parathyroid glands. Philadelphia : Saonders;2003.

17. Ayandipo, Adigun TA, Afawape. Airway complications and outcome after thyroidectomy in Ibadan: A 15 year review. Arch Med.2016;8:4.

18. Burkey SH, van Heerden JA, Thompson GB. Reexploration for symptomatic OP hematomas after cervical exploration. Surgery 2001;130:914-920.

19. Promberger R. OH J, Kober F. Risk factors for post-operative bleeding after thyroid surgery. Br J Surg.2012;99:373-379.

20. Bhattacharyya N, Fried MP. Assessment of the morbidity and compications of total thyroidectomy. Arch Otolaryngol Head Neck Surg.2002; 128: 389-392.

21. Mridul KS, Kaberi K, Kalpana S, Subodh CG. Recurrent laryngeal nerve injury (RLNI) in thyroid surgery and it's prevention. International Journal of Research in Medical Sciences. 2015 Jul; 3(7): 1632-1636.

22. Reham A. Alaa A. Latifah A, Mona A. Evaluation of post-thyroidectomy complications and their management in King Khalid Hospital, Tabuk, Saudi Arabia. IJMHR. 2017; 3(12): 45-50.

23. Antonio RZ, Rodriguez J, Riquelme J. Prospective study of post-operative complications after total thyroidectomy for multinodular goiters by surgeons with experience in endocrine surgery. Anan Surg. 2004; 240(1):18-25.

24. Mehmet AG, Bekir K, Halil D. Complications of completion versus total thyroidectomy. Asian Pacific Journal of Cancer Prevention.2012; 13(10): xvii

25. Page. C, Zaatar R, Biet A, Strunski V. Subjective voice assessment after thyroid surgery: A prospective study of 395 patients. Indian J Med Sci 2007; 61(8).

26. de Pedro Netlo. Voice and vocal self assessment after thyroidectomy. Head Neck 2006; 28(12):1106-14.

27. Hazem MZ, Naif A, Awad A, Ali S. Recurrent laryngeal nerve injury in thyroid surgery. Oman Medical Journal 2011; 26(1): 34-38.

28. Kark AE, Kissin MW, Auerbach R, Meikle M. Voice changes after thyroidectomy: Role of the external laryngeal nerve. BMJ 1984; 289: 1412-15.

29. Jansson S, Tisell L, Hagne I. Partial superior laryngeal nerve lesions before and after thyroid surgery. World J Surg.1998; 12: 522-7.

30. Cernea CR, Ferraz AR, Fulani J. Identification of the external branch of the superior laryngeal nerve during thyroidectomy. Am J Surg.1999; 69: 632-634.

31. Joon HK, Man KC, Yang-IK S. Reliable early prediction for different types of post-thyroidectomy hypocalcaemia. Clinical and Experimental Otorhinolaryngology 2011; 4(2):95-100.