

Thyroidectomy With or Without Recurrent Laryngeal Nerve Exposure

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Abstract

Background: Thyroid surgery complications ranging from recurrent laryngeal nerve injury (RLNI) to death, with improvement of surgical techniques death reduce to minimum while morbidity due to RLNI remains a concern.

Aim: This study was done to determine the prevalence of RLNI in our hospital in cases with exposure and non-exposure of the recurrent laryngeal nerve (RLN) and duration of nerve recovery for all patients with thyroid surgery presenting with goiter.

Methods: This prospective study was carried out at Al-Yarmouk Teaching Hospital from September 2009 - September 2011. 116 thyroidectomy, representing 24 male and 92 female, in a ratio of 1:4, their age ranges between 17-60 with a mean of 30.85 year. All patients undergoing thyroid surgery were included in study. Preoperative and postoperative indirect laryngoscope examination was performed to all patients. Patients divided into two groups.

Results: Group A (thyroid surgery with RLN exposure) (67 patients) shows 2 cases RLNI, Group B (thyroid surgery without RLN exposure) (49 patient) shows 4 cases RLNI. Unilateral RLNI encountered in (5 cases) and bilateral RLNI in (one case).

Conclusion: recurrent laryngeal nerve identification in thyroid surgery seems to give a better result to avoid nerve injury.

Key words: recurrent laryngeal nerve, Thyroidectomy, Nerve injury

Introduction

Surgery on thyroid gland is one of the causes of recurrent laryngeal nerve paralysis. Injury to recurrent laryngeal nerve anywhere along its course usually results in paralysis of the vocal cord. Surgically induced recurrent laryngeal nerve paralyse are frequently not recognized at the time of thyroid surgery¹.

The exact incidence of recurrent laryngeal nerve injury is unknown, different studies have reported varying prevalence (0-14%) this difference in complication rates may reflect variation in surgical experience or number of surgeries performed².

Today with the developments in anesthesia, antisepsis and improvements in surgical technique, thyroidectomy has become a relatively safe procedure. Usually the complications are rare, but when they occur they may be life threatening or lead to severe functional impairment³.

One of the most feared complications of thyroid surgery is recurrent laryngeal nerve injury (RLNI)⁴ and represents nearly half of all complications of thyroid surgery⁵. In addition to the hoarseness that occurs with unilateral RLNI, bilateral RLNI lead to dyspnea and often life threatening glottal obstruction⁶. Reported incidence of permanent RLNI range from 0%-5.2% and temporary RLNI from 0.4%-7.2%⁷.

The incidence of RLNI has been found higher during re exploration, Graves's disease and thyroid carcinoma procedures⁸. Surgically induced recurrent laryngeal nerve paralyse are frequently not recognized at the time of surgery and the difference in complication may reflect variation in surgical experiences⁹. Recently surgeons advocate the routine identification and dissection of recurrent laryngeal nerve to reduce its injury⁸.

Patient and method

This prospective study was carried out in Department of General Surgery, Al-Yarmouk Teaching Hospital from September 2009 - September 2011.

A total of 116 patients with goiter whom underwent thyroid surgery were included in the study. The male to female ratio of 1:4 (24 males and 92 females), their age range was 17- 60 years. The mean age was 30.85 years. In the study all patients with goiter whom underwent thyroid surgery were included in the study. Patients were allocated in two groups on alternate basis for, whether to dissect and identify the RLN (group A) or to perform the surgery without exposing the nerve (group B). Patients with preoperative immobility or reduced mobility of vocal cords were excluded from the study.

Clinical, thyroid function tests, ultra sound of neck, fine needle aspiration, chest x-ray, ECG and other necessary investigations for thyroid surgery were carried out including vocal cord examination by otolaryngologist.

Hemi-thyroidectomy, subtotal thyroidectomy and nearly total / total thyroidectomy were undertaken. In group a, nerve was dissected bilaterally in all patients, apart from those; who underwent Hemi-thyroidectomy, where nerve on relevant side only was identified.

The nerve was identified in the tracheo-esophageal groove, its relationship with inferior thyroid artery and its branches, and then followed where it entered the larynx.

Direct laryngoscope examination at the end of operation by anesthetist and surgeon were done to confirm the movement of vocal cords.

Postoperative vocal cord immobility on day 3 - 5, and reduced mobility beyond 15 days was considered as an indicator of RLNI, and follow up examination were arranged by otolaryngologist on day 15, 30, then at 2nd, 4th, 6th and 12th month postoperatively. Patients whose cord mobility did not recovered at 12 months were considered as having permanent injury.

RESULTS

Different types of goiter included in this study with highest rate was for multi-nodular goiter 55 patient (47.42%), carcinoma of the thyroid gland in 4 patients (3.34%) with the lowest rate for recurrent

goiter was 3 patients (2.57%). Most of patients underwent Subtotal thyroidectomy and near total/ total thyroidectomy representing 37.93%, 34.48% respectively. (Table 1)

Table 1: Pathology of goiter and type of operation.

pathology	Hemi-thyroidectomy		Subtotal thyroidectomy		Nearly total/ total thyroidectomy		Total (pathology) N=116	
	No.	%	No.	%	No.	%	No.	%
Multi-nodular goiter	0	0.00	39	88.63	16	40.00	55	47.42
Solitary thyroid nodule	32	100.00	0	0.00	0	0.00	32	27.59
Hyperthyroidism	0	0.00	5	11.37	17	42.50	22	18.97
Carcinoma	0	0.00	0	0.00	4	10.00	4	3.45
Recurrent simple Goiter	0	0.00	0	0.00	3	7.50	3	2.57
total (operation) N=116	32	27.59	44	37.93	40	34.48	116	100

In this study, the overall frequency of RLNI were 6 patients, 5 patients got unilateral RLNI (4.31%), whereas bilateral RLNI develop in one patient only (0.86%). For group A, RLN was identified during surgery, 2 out of 67 patients (2.98%) develop temporary RLNI and this represent 1.72% of total number of patients. The injury was noted immediately after surgery, when direct laryngoscope revealed immobility of vocal cord on one side, and on first post-operative day patients have hoarseness of voice. Of group A, one patient underwent nearly total thyroidectomy for malignancy, and the other one for recurrent goiter. These patients show

complete recovery of vocal cord paralysis after four months follow up. In group B, where RLN was not identified, RLNI was seen in four patients (8.16%) and this represent 3.45% of total number of patients. Three of these patients develop temporary injury; one underwent Hemi-thyroidectomy for solitary nodule, the other one sub-total thyroidectomy for multi-nodular goiter and the third one sub-total thyroidectomy for a toxic goiter while permanent injury was seen in one patient with near total thyroidectomy for multi-nodular goiter, as shown in (table 2, 3).

Table2: type of RLNI in different patient group.

Nerve injury patient N=116	Group A		Group B		Total N=116	
	No.	%	No.	%	No.	%
Unilateral vocal cord paralysis	2	1.72	3	2.59	5	4, 31
Bilateral vocal cord paralysis	0	0.00	1	0.86	1	0, 86
Sum*	2	1.72	4	3.45	6	5.17
Temporary vocal cord paralysis	2	1.72	3	2.59	5	4, 31
Permanent vocal cord paralysis	0	0.00	1	0.86	1	0, 86
Sum**	2	1.72	4	3.45	6	5.17

Sum* for laterality of paralysis.

Sum** for periodicity of paralysis.

Overall thyroid surgery RLNI was 5.17%, an increase in the rate of RLNI can be observed in thyroidectomy for recurrent goiter (1 patient of 3) about 33.34% vs. 4.42% (5 patients out of 113) in

primary operation, while In malignancy RLNI it was high as 25.00% (1 patient out of 4) vs. benign which was relatively low about 4.46% (5 patients out of 112).

Table3: type of operation and rate of RLNI in different patient group.

Operation type	Group A N=67 *			Group B N=49 *			Total N=116		
	No.	RLNI	%	No.	RLNI	%	No.	RLNI	%
Hemi-thyroidectomy	16	0	0.00	16	1	6.25	32	1	3.12
Subtotal thyroidectomy	25	1	4.00	19	2	10.53	44	3	6.82
Nearly total / total thyroidectomy	26	1	3.84	14	1	7.14	40	2	5.00
Sum	67	2	2.98	49	4	8.16	116	6	5.17

* χ^2 : 0.09, df: 1, P= 0.759 (Yates corrected)

Follow up of patients with RLNI it can be noticed that 5 patients out of 6 (83.34%) of injuries recover itself and only one of the six patients develops permanent RLNI (16.66%) and this represent only 0.86% of the total sample of the study. To find the association between the groups of the study and RLNI and which group seem to be more venerable for RLNI, Chi-square Test using SPSS programme show that, the majority of cases seemed to be complicated by RLNI were in group B of study rather than group A (but this difference was not statistically significant. (Table 3)

Discussion

The overall incidence of RLNI after thyroidectomy ranges 0% - 5.2% for permanent injury, and 0.4% - 7.2% for temporary injury^{10,11,12}. Our result confirm this with permanent RLNI of 0.86% and temporary RLNI of 4.31%. Permanent injury results from transaction, ligation, or traction, while temporary injury is due to neuropraxia resulting from excessive manipulation. Hoarseness of voice after thyroidectomy is considered by many authors as an indicator of RLN palsy, this vary widely depending on definition ,patient selection ,surgeon ,type of thyroidectomy and underlying diseases¹³.

Our result of overall thyroid surgery RLNI was 5.17%, with an increase of percentage in cases of

malignancy and recurrent thyroid surgery; despite the number reports of safety during more extensive thyroid surgery, cancer operation and recurrent thyroidectomy were associated with higher complications. RLNI consistently reported lower with thyroidectomy for benign disease rather than recurrent thyroidectomy¹⁴.

In thyroidectomy for malignancy or recurrence, RLNI was up to 33.34% and 25.00% respectively which is somewhat similar to other studies which reach up to (25 %) ¹⁵. Postoperative recovery rate for RLNI was 83.34%, which is as good as recovery rang of other studies (50-80 %) ¹⁶.

Although routine identification of recurrent laryngeal nerve has been a matter of discussion, with varying result ¹⁷. In our study the nerve injury decrease from 8.16% in non-exposed nerve to 2.98% in exposed nerve procedure. Some have found that careful identification of the RLN significantly reduces the major complication of nerve injury ¹⁸. The opinion that the approaches which do not expose the nerve cannot be recommended ¹⁹.

Conclusion

The RLN identification in thyroid surgery demonstrates lower incidence of nerve injury, compared with non-nerve identification procedures.

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