



Recurrent Laryngeal Nerve Injury After Thyroid Surgery

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Abstract

Back ground: Vocal cord paresis or paralysis due to injury of the recurrent laryngeal nerve (RLNI) is one of the main complications in thyroid surgery. Many procedures have been introduced to prevent the nerve injury; still the incidence of recurrent laryngeal nerve palsy varies between 1.5-20%.

Objectives: The aim of our study is to assess the risk factors of recurrent laryngeal nerve injury during thyroid surgery .

Patients and Methods: patients who had thyroid surgery between 3 January 2014to 20 December 2016 were admitted to the surgical department

ofBaqubah teaching hospital collected for this retrospective review . Factors predisposing to recurrent laryngeal nerve injury were evaluated such as benign or malignant lesions, type of operation and identification

of RLN intra operatively . Preoperative and postoperative indirectlaryngoscopicexaminations were performed for all patients .

Results:198 patients were included in this study. Transient unilateral vocal cord problems occurred in 13 (6.6%) cases, and in 2 (1.0%) cases, it became permanent (LT.lobectomy,Bilateralsubtotalthyroidectomy). Bilateral vocal cord problems occurred in 4 cases (2.0%), but none became permanent. There were significant increases in the incidence of recurrent laryngeal nerve injury in total/sub total thyroidectomy (18.2% in total vs. 7.4 % in subtotal), non-identification of RLN during surgery 15.2% in nonidentification vs. 6.6% in identification) and in malignant disease (20% in malignant vs. 8.0% in benign), and in recurrent goiter (16.7%). Also there was significant difference in the incidence of recurrent laryngeal nerve injury with regards to gender (12.5% in male vs7.8% in female).

Keywords: recurrent laryngeal nerve ,thyroid surgery

Introduction

RLN injuries represent one of the most feared complications after thyroid surgery .These injuries induce a significant post-operative morbidity, as the RLN innervates all intrinsic muscles of the larynx except the cricothyroid muscle , injury of this nerve induces aparesis or paralysis of the vocal cord . 1,2 Complications such as bleeding, hypoparathyroidism and Recurrent Laryngeal Nerve Injury (RLNI) represent nearly half of all the complications of thyroid surgery.3,4,5 The latter complication after thyroidectomy, although infrequently encountered, can jeopardize the quality of life.6 In addition to the

hoarseness that occurs with unilateral RLNI, bilateral RLNI leads to dyspnea and often life-threatening glottal obstruction.7,8 The incidence of RLNI has been found to be higher during re-explorations, Graves disease and thyroid carcinoma procedures.9,10 RLNI is a major concern in thyroid and parathyroid surgery. Therefore, methods that can reduce the incidence of this complication are of great interest.11 An almost certain way to ensure the integrity of theRLN is to always identify the nerve during all surgical procedure on thyroid and parathyroid glands.12,13 The aim of the present study is to assess the factors influencing the risk of RLN injury during thyroid surgery.

Patients and Methods

A review of patient recorded with thyroid surgery for the period from 3 January 2014 to 20 December 2016 and were admitted to the surgical department of Baqubah teaching hospital . Patient’s charts were evaluated for history, physical examination, thyroid function tests and operative reports for the type of operation (total, or subtotal thyroidectomy) and also to check if RLN was identified or not. Types of the operation as done for thyroid carcinoma and recurrent goiter were included in the study. Attempts were made to identify the RLN. The cases were analyzed for RLNI in relation to sex (females and males numbers) also involved in this study.

Results

198 patients underwent thyroid surgery during the study period.

The age of patients ranged between 18 to 67 years (median age 43 years). Most of patients were females (166, 83.8%), males (32, 16.2%) table(3). On preoperative assessment, all cases had normal vocal cords. The indications for surgery were; multinodular goiter 128 cases (64.6%), solitary thyroid nodule 48 cases (24.2%), thyroid carcinoma 10 cases (5.05%), recurrent goiter 12 cases (6.06%) table (1). Unilateral vocal cord paresis (UVCP) developed in 13 cases (6.6%), transient unilateral vocal cord paresis (TUVCP) developed in 11 cases (5.5%) and permanent unilateral vocal cord paresis (PUVCP) developed in 2 cases (1.0%). Whereas, bilateral vocal cord paresis (BVCP) developed in 4 cases (2.0%), all of these cases are transient and there were no permanent injury. table (2)

Table 1 : Indications for surgery

Pathology	Patients	
	No.	%
1-Multinodular goiter	128	64.6
2-Solitary thyroid nodule	48	24.2
3-Thyroid carcinoma	10	5
4-Recurrent goiter	12	6.1
Total	198	99.9

Table 2: Types of operations and RLNI

Operations	Patients No. %		No. of RLN palsy (%)					
			Transient				Permanent	
			Unilateral %	No.	Bilateral %	No.	No.	%
1. Unilateral Subtotal Thyroidectomy	128	64.6	8	6.2	2	1.6		
2. Unilateral Subtotal Thyroidectomy	48	24.2	3	6.2				
3. Total, Near total Bilateral Thyroidectomy A-Thyroid carcinoma	10	5	1	10	1	10	1	10
B- Reoperation for Recurrent goiter	12	6.1	1	8.3	1	8.3	1	8.3
Total	198	99.9	13	30.7	4	19.9	2	18.3

Table 3: Risk factors for Recurrent laryngeal nerve injury during thyroid surgery

Risk factors	Patients		RLNI No.	
	No.	%	%	
Gender				
Female	166	83.8	13	7.8
Male	32	16.2	4	12.5
Total	198	100	17	20.3
Identification of the nerve				
yes	152	76.7	10	6.6
No	46	23.3	7	15.2
Total	198	100	17	21.8
Type of operation				
Bilateral Subtotal, Unilateral subtotal	176	88.9	13	7.4
Total/near total	22	11.1	4	18.2
Total	198	100	17	25.6
Pathology				
Benign	188	95.0	158.0	
Malignant	10	5.0	220.0	
Total	198	100	17	28.0

There was a significant increase in the incidence of RLNI in total/near total thyroidectomy (18.2%) while in subtotal thyroidectomy(7.4%). IN reoperation for recurrent goiter (16.7%).Table (2). Identification of RLN during surgery (6.6%) vs. in non-identification(15.2%). In malignant disease (20%) while in benign disease(8.0%). Also there was significant difference in the incidence of RLNI in terms of gender (12.5% in males vs. .7.8% in females).table (3).

Discussion

In the last years, total,near total thyroidectomy has replaced bilateral subtotal thyroidectomy as the preferred operation for the management of patients with bilateral benign multinodulargoitre, Graves' disease, and all thyroid cancer patients. The principal change in operative technique has been the move from 'lateral dissection' to 'capsular dissection. While in our hospital still unilateral and bilateral subtotal thyroidectomy mainly used due to many factors and causes like facilities and circumstances..14

The incidence of Injuries to the recurrent laryngeal nerve has been reported between 1% to 12% from different thyroid surgery centres when performed by experienced neck surgeons.In our study the incidence of injuries to the recurrent laryngeal nerve has been

reported between 6.6% to 20%. This incidence is higher when thyroidectomy is performed by a less experienced surgeon,15,16,17 or when thyroidectomy is done for a malignant disease. Sometimes the nerve is purposely sacrificed if it runs into an aggressive thyroid Cancer.18 In the present study, the rate of RLNI was 8.6%. This complication is generally unilateral and transient, but occasionally it can be bilateral and permanent and it may be either deliberate or accidental.19,20 The permanent lesion of damaged RLN often manifests as an irreversible dysfunction of phonation and is the most common complication following thyroid surgery. 21Permanent injuries to the recurrent laryngeal nerve are best avoided by identifying and carefully tracing the path of the recurrent nerve.22 Surgeon's experience, histopathologic diagnosis, previous thyroid surgery, surgical technique and anatomic variations are important factors affecting this complication.In the present study there were no permanent injury to the RLN.23 Mechanisms of injury to the nerve include complete or partial transection, traction, or handling of the nerve, contusion, crush, burn, clamping, misplaced ligature, and compromised blood supply, rough intubation by anesthetist leads to laryngeal oedema .24,25 In unilateral RLNI, the voice becomes husky because the vocal cords do not approximate with one another. Dysphonia starting on the 2nd – 5th post-operative days is commonly due

to edema, whereas traction injury of the nerve and damage of axons may result in dysphonia lasting up to 6 months. Dysphonia continuing after 6 months is commonly permanent caused by cutting, ligating or cauterization of the nerve.²⁶ Bilateral RLNI is much more serious, because both vocal cords may assume a median or paramedian position and cause airway obstruction and tracheostomy may be required. Accidental transection commonly occurs at the level of upper two tracheal rings, where the nerve closely approximates the thyroid lobe in the area of Berry's ligament. ^{27,28}Deliberate identification of the RLN minimizes the risk of injury. When the nerve is identified and dissected, the reported RLN injury rate during thyroidectomy is 0 - 2.1%. In our study it is between 6.6% in identification of RLN to 15.2% in non-identification. This is reportedly higher in the re-operative setting (2-12%) or if the nerve is not clearly identified (4-6.6%).²⁹ Intraoperative hemostasis and a thorough understanding of the anatomy are essential for nerve identification and preservation.³⁰ RLNI is more common in operations for thyroid carcinoma, hyperthyroid (toxic) goiter and recurrent goiter cases.

In recurrent goiter, injuries are due to adhesions and anatomical displacement whereas in hyperthyroid cases, it is due to increased vascularization of the gland.^{30,31} In present study, the rate of RLNI was 20% in thyroid carcinoma and in benign goiter cases, the transient RLN injury rate was 8.0% and permanent in 0%. The rate was highest (16.7%) in recurrent goiter cases. Type of surgical procedure is another factor influencing the rate of RLN injury. In subtotal thyroidectomy cases RLNI rate was low while it is higher in total thyroidectomy cases.³⁷ In the present study, transient RLNI rate was 7.4% in subtotal compared to 18.2% in total/ near total thyroidectomy.

Conclusion

The present study showed that thyroid carcinoma, re-operation for recurrent goiter, total thyroidectomy, non identification of nerve and Gender of patients were associated with a significantly increased risk of operative RLNI.

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