ORIGINAL ARTICLE

FREQUENCY OF RECURRENT LARYNGEAL INJURY IN THYROIDECTOMY SURGERY

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ABSTRACT

Background: Thyroidectomy is one of the most complicated surgeries because of damage to recurrent laryngeal nerve. The objective of the study was to determine the frequency of recurrent laryngeal injury in thyroidectomy surgery.

Material &Methods: This record based, cross sectional study was conducted in the department of general surgery, Gomal Medical College, D.I.Khan, from 2008 to 2014. Sample size of the study was 104, selected through consecutive sampling technique. Patients who underwent thyroid surgery for thyroid disease were included. Indirect laryngoscopy was performed preoperatively and was repeated postoperatively for all patients. Demographic variables were gender, age in years, age groups. Research variables were type of surgery, technique, type of goiter. Histological diagnosis with dysphonia or vocal cord paralysis greater than 06 months duration was termed as permanent RLN injury while less as temporary injury.

Results: Out of total 104 patients 84 (81%) were females and 20 (19%) were male. Indications for surgery were multinodular goiter in 62 cases, solitary nodule in 18, hyperthyroidism in 17, thyroid carcinoma in 2 and recurrent goiter in 5 cases. Bilateral subtotal thyroidectomy was performed in 71 cases (68%), unilateral subtotal thyroidectomy in 13 (12%), unilateral total thyroidectomy in 6 (6%), bilateral total thyroidectomy in 6 (6%), nodule excision in 3 (3%) and completion thyroidectomy for recurrent goiter in 5(5%) cases.

Conclusion: Frequency of RLN injury was almost 5% as whole in thyroid surgery but rate was more in complicated cases like thyroid carcinoma, recurrent goiter and hyperthyroid goiter because of altered anatomy.

KEY WORDS: Recurrent Laryngeal Nerve; Thyroidectomy; Goiter.

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INTRODUCTION

Thyroidectomy is one of the most complicated surgeries because of the close vicinity of the recurrent laryngeal nerve (RLN) with the thyroid gland that is always at risk for damage; a very dreadful complication of thyroidectomy. Due to its important function in controlling the vocal cords, this complication is readily diagnosed post operatively. Thus the performance of a surgeon is best evaluated by avoidance of recurrent laryngeal nerve palsy.[1]

Trauma to RLN is seen in up to 1% of primary thyroid surgery while the incidence is slightly higher in thyroid cancer surgeries, Grave's disease and re-exploration surgeries.[2-4]

Unilateral RLN trauma is less serious complication as compared to bilateral RLN damage which is characterized by phonatory, respiratory and psychological problems causing social and physical trauma to the patient. How to avoid RLN damage during surgery is still controversial as far as the method is concerned.[5]A study showed that 31 patients (4.98%) had RLN injury with 27 patients having unilateral and 4 patients having bilateral injuries. Twenty eight patients had temporary loss of function while 3 had permanent. Six patients also underwent RLN anastomosis per operatively and had transient hoarseness post operatively.[6] The objective of the study was to determine the frequency of recurrent laryngeal injury in thyroidectomy surgery.

MATERIAL AND METHODS

This record based, cross sectional study was conducted in the department of general surgery, Gomal Medical College, D.I.Khan, from 2008 to

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2014. Sample size of the study was 104, selected through consecutive sampling technique. Patients who underwent thyroid surgery for thyroid disease were included. Indirect laryngoscopy was performed preoperatively and was repeated postoperatively for all patients.

Patients records were analyzed. History, physical examination, full blood count, routine biochemical tests, chest and cervical spine x-rays, thyroid scan, ultrasound and thyroid function tests were used for pre-operative evaluation of the patients. All operations were performed by a single surgical team. Six types of surgeries were performed viz. unilateral subtotal, unilateral total, bilateral subtotal, bilateral total, total thyroidectomy and nodule excision. Extra-capsular technique using radical thyroidectomy in extra-capsular plan was utilized which resulted in identification of RLN and parathyroid glands without causing any injury. Post-operative laryngoscopy was performed repeatedly for 48 – 72 hours to assess vocal cords function.

In all cases RLN was tried to be identified using inferior thyroid artery up to the penetration point at the larynx, with inferior thyroid artery ligation. If RLN was not identified, structures resembling RLN were saved. Surgery was completed with the placement of post-operative drain.

Demographic variables were gender, age in years, age groups. Research variables were type of surgery, technique, type of goiter. Histological diagnosis with dysphonia or vocal cord paralysis greater than 06 months duration was termed as permanent RLN injury while less as temporary injury.

RESULTS

Out of 104, 84 patients were females and 20 were males. Age of the patients ranged from 20-78 years with mean ± SD (48±8 years). Ninety eight patients were having 1st surgery and 6 were having 2nd surgery. Age wise gender distribution is given in table 1.

Table 1: Age wise gender distribution of patients having thyroidectomy (n=104)

Age group	Gender	
	Male	Female
20-39 years	5	21
40-59 years	8	34
60-78 years	7	29

The diagnosis was multinodular goiter in 62 (60%), solitary nodule in 18 (17%) and hyperthyroid goiter in 17 (16%) patients, recurrent goitor in 5 (5%) and thyroid carcinoma in 2 (2%) patients. Number of RLN palsy in these different thyroide diseases.

Table 2: RLN palsy in different thyroid diseases in patients having thyroidectomy (n=104)

Histopathological diagnosis	Number of patients(%)	Number of RLN palsies(%)
Multinodular goiter	62 (60)	2 (2.6)
Solitary nodule	18 (17)	0
Hyperthyroid	17 (16)	1 (8.7)
Recurrent goiter	5 (5)	1 (21.7)
Thyroid carcinoma	2 (2)	1 (40)

The RLN was identified bilaterally in 92 (88.5%) patients, where in 6 (5.3%) patients only right and in 4 patients (4.3%) only left RLN can be identified. In 2 (1.9%) patients neither of the RLN's could be identified.

In 96 (92%) patients, the inferior thyroid artery was identified. However, in 4(4%) patients, the right and left inferior thyroidal artery each could not be identified. Indirect laryngoscopy revealed vocal cord paralysis in 5 patients (5%).

Table 3: RLN palsy in different thyroid surgeries (n=104)

Operations	Number of patients (%)	Number of RLN palsies (%)
Bilateral subtotal thyroidectomy	71 (68)	2 (2.3)
Unilateral subtotal thyroidectomy	13 (12)	0
Unilateral total thyroidectomy	6 (6)	1 (1.9)
Bilateral total thyroidectomy	6 (6)	1 (22.6)
Complete thyroidectomy	5 (5)	1 (21.7)
Nodule excision	3 (3)	0

DISCUSSION

Injury to RLN during thyroidectomy is a major complication which is usually unilateral and temporary but if bilateral injury occurs it can be debilitating and permanent. Factors which affect complication rate are anatomical variations, surgeons experience, previous surgery, histological diagnosis and surgical technique.[7]

Causes of RLN paralysis are severing of the nerve, ligation, traction and trauma due to aspiration, hemostasis or cauterization.[8, 9]

Local edema will cause temporary dysphonia starting on 2nd-5th post-operative days while temporary dysphonia lasting less than 06 months is caused by traction and damage to axons of RLN.[10] Permanent dysphonia more than 06 months is due

to cutting, ligation or cauterization. RLN damage is more common in surgeries performed for carcinomas, hyperthyroid goiter due to increased vascularity and recurrent goiter due to adhesions and anatomical disorders.[11–14] In our study RLN injury in thyroid carcinoma cases was 13%, hyperthyroid goiter was 8.7% and in recurrent goiter it was 21.7%.

Type and surgical procedure is another factor for RLN injury. It is less common in subtotal thyroidectomy as compared to total thyroidectomy.[15] In a study by Zakariya, et. al RLN injury was 7.2% in total thyroidectomy, 1.9% in subtotal thyroidectomy, 12.8% in throid carcinoma and 2.9% in hyperthyroid goiter.[16] In our study RLN injury was 2.3% for bilateral total thyroidectomy. Another study reported 13.6% transient and 9% permanent RLN paralysis in bilateral total thyroidectomies while in cases of complete thyrodictomy RLN paralysis was 13% transient and 8.7% permanent.[17]

Another important factor is the anatomical variation in the course of RLN. RLN is most commonly identified using the inferior thyroid artery which also has a variable course and thus is unreliable, even in the same patient right and left side may have different courses.[18] In our study inferior thyroid artery was identified in 92% patients. The method of protecting RLN from injury during surgery is still controversial where some surgeons say that omitting RLN identification may cause little trauma while other studies have disproved this idea.[13,14]

CONCLUSION

Frequency of RLN injury was almost 5% as whole in thyroid surgery but rate was more in complicated cases like thyroid carcinoma, recurrent goiter and hyperthyroid goiter because of altered anatomy. Further studies are needed to distinguish between transient and permanent paralysis of vocal cards.

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CONFLICT OF INTEREST
Authors declare no conflict of interest.
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