

Frequency of Recurrent Laryngeal Nerve Palsy after Thyroidectomy at Sheikh Khalifa Bin Zaid Hospital Rawlakot Azad Kashmir

1. Malik Asrar Ahmed 2. Amir Ahmed 3. Zia-ur-Rehman

1. Asstt. Prof. of Surgery, 2. 1. Asstt. Prof. of Orthopedic Surgery, 3. Prof. of Surgery and Principal, Poonch Medical College, Rawlakot, Azad Jammu & Kashmir

ABSTRACT

Objectives: The objective of the study was to determine the frequency of post thyroidectomy RLN palsy and to adopt measures to reduce the frequency of RLN palsy after thyroidectomy.

Study Design: Descriptive study

Place and Duration of Study: This study was carried out at General Surgery Department, Sheikh Khalifa Bin Zaid Hospital Rawlakot Azad Kashmir from 16.11.2012 to 16.11.2014

Materials and Methods: Total of 80 patients of goiter undergoing thyroidectomy were admitted through outpatient department. All patients underwent thorough clinical examination and investigations. They were informed of the benefits and risks associated with surgery and written informed consent was obtained. All information was recorded on performa. Vocal cord status was assessed pre and postoperatively by indirect laryngoscopy. Size of thyroid gland was measured before operation in all the patients and weight of thyroid tissue removed during operation was also assessed. 03 patients were excluded from the study as they were already having hoarseness of voice. 29 were subjected to subtotal thyroidectomy, 30 to total thyroidectomy, and 21 to hemi-thyroidectomy randomly. All were followed up for RLN palsy for 03 months. According to our objective, no test of significance was applicable. However, descriptive statistics including mean, standard deviation was used by using Microsoft statistical package for social sciences "SPSS Version 10."

Results: The age range of the patients undergoing thyroidectomy was 20-68 years with an average age of 44. Total mortality rate was 0%. Transient hoarseness of voice was present in 01(1.2%) which improved spontaneously with time and permanent hoarseness in 0% patients. No patient was lost at any point.

Conclusion: Frequency of RLN palsy can be reduced by careful identification of recurrent laryngeal nerve by various methods per-operatively.

Key Words: Recurrent laryngeal nerve, Thyroidectomy, Frequency, laryngoscopy

Citation of article: Ahmed MA, Ahmed A, Rehman Z. Frequency of Recurrent Laryngeal Nerve Palsy after Thyroidectomy at Sheikh Khalifa Bin Zaid Hospital Rawlakot Azad Kashmir. Med Forum 2015;26(8):

INTRODUCTION

Patients with thyroid disease either present with a lump in the neck which is of thyroid origin (a goiter), hypothyroidism or symptoms and signs of hyperthyroidism (thyrotoxicosis). Damage to the recurrent laryngeal nerve (RLN) during thyroid or parathyroid surgery is the most common iatrogenic cause of vocal cord paralysis. Identification of the RLN and meticulous surgical technique can significantly decrease the incidence of this complication. Surgeons need to be aware of their position. Non-recurrent recurrent laryngeal nerve (NRRLN) is associated with a right subclavian artery arising from distal aortic arch. Awareness of their existence and correct surgical technique will prevent the surgeon from accidental lesion of NRRLN if it is encountered during thyroid or

parathyroid surgery¹. RLN damage leads to a significant morbidity up to 20% depending upon the surgery performed. RLN damage also depends upon the size of thyroid gland and volume of thyroid tissue resected.² RLN palsy after thyroidectomy although infrequently encountered, can decrease quality of life. In addition to the hoarseness that occurs with unilateral RLN palsy, bilateral palsy leads to dyspnea and often to life-threatening glottal obstruction. Therefore, intra-operative awareness of the nerve's status is of great importance. All patients must be examined postoperatively by direct laryngoscopy or laryngofiberscopy to check vocal cord mobility. If we detect vocal cord palsy immediately after surgery, palsy often recovers within 1 year when visual preservation of RLN is successful.³ Bilateral RLN paralysis after thyroidectomy is infrequent, but serious when it occurs. Intraoperative knowledge of the status of the nerve after dissection could potentially provide the surgeon with important decision-making information.⁴ Patients without voice complaints can have vocal cord motion impairment. Patients can also have vocal cord motion

Correspondence: Dr. Malik Asrar Ahmed,
Asstt. Prof. of Surgery, Poonch Medical College,
Rawlakot, Azad Jammu & Kashmir.
Cell No.: 03234004413
E-mail: ajkdrasar@yahoo.com

impairment contralateral to the thyroid lesion. Preoperative Vocal cord examination helps to counsel patients appropriately about the risks of surgery and helps outline a plan for the extent of surgery while minimizing the medico legal ramifications of iatrogenic RLN injury.⁵ RLN palsy may lead to respiratory obstruction post-operatively for which intubation followed by tracheostomy may be required.⁶

Modifications of phonation occurring after total thyroidectomy (TT) are usually attributed to surgical malpractice, but other causes of voice impairment even in non operated subjects should also be taken into account.⁷ RLN palsy should be detected before surgery for thyroid diseases with regard to the incidence of malignancy, histopathologic distribution, extrathyroidal invasion, management, and prognosis. Thyroid tumor associated with RLN palsy is strongly suggestive of malignancy. The RLN should be preserved if it has not been invaded by the tumor, because it offers a good chance of functional recovery postoperatively.⁸ Operations for thyroid cancer, Graves' disease, and recurrent goiter demonstrated significantly higher RLN palsy rates. Postoperatively, the RLN recovered in most of the patients without documented nerve damage during the operation.⁹ Injury to the RLN is a rare complication of initial thyroid and parathyroid surgery, but the prevalence is much higher in the reoperative setting. The use of continuous, intraoperative electromyographic monitoring of the RLN has been suggested to improve the safety of cervical explorations. Intraoperative electromyographic monitoring of the RLN in reoperative neck surgery can be performed safely but did not decrease RLN complications. Experience and routine nerve exposure remain crucial to the minimization of RLN complications.¹⁰

Continuous laryngeal nerve integrity monitoring (NIM) during thyroidectomy is associated with a decreased risk of postoperative RLN injury.¹¹ Total lobectomy with routine RLN identification is recommended as a basic procedure in thyroid surgery.¹² Only identification of RLN and its careful exposure allow prevention of iatrogenic injuries. Damage to the RLN or to one of its branches may be avoided only by identification and careful exposure of the nerve itself. An experienced surgeon with good knowledge of the anatomy of the RLN and its anatomical variations is required for uncomplicated treatment of thyroid disease.¹³ Great care is required following presumed identification of the RLN to ensure that there are no other unidentified branches.²⁰

The permanent lesion of damaged RLN often manifests as an irreversible dysfunction of phonation and is seen following thyroid surgery. The frequency of this complication ranges from 0.5 to 5% in different thyroid surgery centers and increases in case of both recurrent goiter and complete thyroidectomy due to thyroid cancer. The RLN lesion varies from irreversible,

persistent and transient dysfunction with good prognosis of complete recovery. The time of RLN function recovery ranges from several weeks to two years (mainly 6 months)¹⁴. Vocal cord palsy often recovers within 1 year when visual preservation of RLN is successful.⁴ Intraoperative neuromonitoring has been widely adopted to facilitate the identification and preservation of recurrent laryngeal nerve (RLN) function during thyroid surgery. There are pitfalls associated with the use of intraoperative neuromonitoring during thyroid surgery. Routine application is not recommended except for selected high risk patients¹⁵. This study was conducted to detect the overall rate of RLN palsy after thyroid surgery at SKBZ Hospital Rawlakot so that appropriate measures can be taken to reduce this rate.

MATERIALS AND METHODS

The study was carried out at the Department of General Surgery Department Sheikh Khalifa Bin Zaid Hospital Rawlakot Azad Kashmir. SKBZ hospital is a tertiary health care center from 16/11/2012 to 16/11/2014. Its catchment areas are District Bagh, Poonch, Kotli and some other areas. At SKBZ hospital Rawlakot, General Surgeons deal with goiter and thyroidectomies are being performed. The hospital is providing twenty four hour emergency services. The hospital has well equipped laboratory facility as well.

A total of 80 patients of goiter undergoing thyroidectomy were selected for study of frequency of recurrent laryngeal nerve palsy after thyroidectomy. All these patients were admitted in surgical wards of SKBZ hospital Rawlakot. These patients were admitted through outpatients department (OPD) with symptoms.

Sampling technique: The technique used is convenience sampling (non-probability).

Inclusion criteria: All the patients undergoing thyroid surgery were included in the study. A total of 29 patients were there who underwent subtotal thyroidectomy for multinodular goiter. Those with thyroid malignancy undergoing total thyroidectomy were included. A total of 30 patients underwent total thyroidectomy. The patients with thyroid cyst undergoing hemithyroidectomy (lobectomy and isthmusectomy) were also included in the study. A total of 21 patients underwent hemithyroidectomy.

Exclusion criteria: Patients with thyroid malignancy already having RLN palsy. Already operated patients suffering from RLN palsy.

The patients who already had hoarseness of voice and previous thyroid surgery were excluded from the study. There were three patients who were excluded. Two were already operated and were having hoarseness of voice. First patient was operated in 1999 for thyroid cancer. She developed hoarseness of voice post-operatively. Got treatment from many centers for this hoarseness, but it was not cured. Now she presented

with recurrence and surgery was planned for her. Second patient was again an operated case of thyroid cancer. Operated in the year 2000. He was admitted for surgery because of recurrence. Third patient was a case of thyroid cancer and there was hoarseness of voice. Indirect laryngoscopy was done and vocal cord paresis on right side was found.

Ethical Considerations: The study was carried out after formal approval from ethical committee of the hospital.

Data collection procedure: In the study, variables included were age and gender. The initial diagnosis of goiter was made on the basis of history, clinical examination and investigations (Ultrasonography and ct-scan). The management of the patients was planned after the patients were thoroughly evaluated and investigated. During surgery, the thyroid lobes were drawn forward and medially, and search for inferior thyroid artery and RLN was made. Scalpel was used in view of possible injury to trachea or to RLN. When both thyroid arteries had been ligated there was surprisingly little bleeding from the flat cut surface of the gland, and haemostasis was achieved by ligatures. Post-operative laryngoscopy of the patients was done. Hoarseness of voice and its duration, vocal cord status was noted. Patients were assessed for all the complications including recurrent RLN for transient and permanent hoarseness of voice for six months. Study performa included demographic data, presenting complaints, associated diseases during and procedure done. Transient and permanent hoarseness of voice was recorded.

Data analysis: At the end of study period, all the entered values were analyzed and the results were seen. According to our objective, no test of significance was applicable. However, descriptive statistics including mean, standard deviation was used by using Microsoft statistical package for social sciences "SPSS Version 10."

RESULTS

In this study, a total of 80 patients were studied who underwent thyroid surgery. There was alteration of voice in 01(1.2%) patient. It was transient. It depended upon the experience of the operating surgeon, type of thyroid disease and size of thyroid gland and weight of thyroid tissue removed. In all the cases, RLN was searched. Three patients were excluded from the study as they were already having hoarseness of voice. One was previously operated for follicular carcinoma of the thyroid and rest of the two were having carcinoma of thyroid. No patient was dropped out or lost at any point. According to our objective, no test of significance was applicable. However, descriptive statistics including mean, standard deviation and proportion was used by using "SPSS Version 10." The age range of the patients was 30 to 60 years with a mean of 45 years, median 44

years and mode 46 years undergoing subtotal thyroidectomy. For hemithyroidectomy age range was 39 to 52 years and mean age was 45.5 years, median 43 years and mode 39 and 41 years. For total thyroidectomy mean age was 33 to 41 years and mean age was 37 years, median 36 years and mode 33 years. Transient palsy of recurrent laryngeal nerve was present in one patient (1.2%) and permanent palsy was in no patient (0%).

Table No.1: Age of Patients Undergoing Thyroidectomy (N=80)

Mean	40.6750
Std. Deviation	6.3181
Range	26.00
Minimum	31.00
Maximum	57.00

Table No.2: Gender of Patients Undergoing Thyroidectomy (N=80)

Gender	Number	%	Valid %	Cumulative %
Male	48	60.0	60.0	60.0
Female	32	40.0	40.0	100.0
Total	80	100.0	100.0	

Table No.3: Diagnosis of Patients Undergoing Thyroidectomy (N=80)

	Number	%	Valid %	Cumulative %
Multi Nodular Goitre	28	35.0	35.0	35.0
Thyroid Cyst	22	27.5	27.5	62.5
Follicular CA Thyroid	1	1.3	1.3	63.8
Papillary CA Thyroid	1	1.3	1.3	65.0
Thyroid CA	28	35.0	35.0	100.0
Total	80	100.0	100.0	

Table No.4: Post Thyroidectomy Clinical Findings and Indirect Laryngoscopy (IDL) (N=80)

	Number	%	P - value
Hoarseness of Voice	1	1.25	0.218
Laryngeal Nerve Palsy	1	1.25	0.218

p-value <0.05 is considered statistically significant

DISCUSSION

There are various studies carried out to determine the frequency of RLN palsy after thyroidectomy. There are various types of thyroidectomies depending upon the type of the disease. In multinodular goiters subtotal thyroidectomy, in case of thyroid cyst of solitary thyroid nodule hemithyroidectomy (lobectomy and isthmusectomy) and in case of carcinoma of thyroid usually total thyroidectomy is performed depending upon the lesion and requirement.¹⁶ Our study was carried out to determine the frequency of RLN palsy after various types of thyroidectomies at SKBZ hospital Rawlakot.

Post-operative recurrent laryngeal nerve palsy was present in 1(1.2%) of the patients. There was temporary hoarseness of voice. Patient was followed up and it was settled later on. A similar study was conducted by Muhammad Arif at Liaquat Medical College Hospital (LMCH). He studied 170 patients who underwent thyroidectomy. In his study, out of 170 patients who underwent thyroidectomy, alteration of voice suggestive of RLN palsy was there in 16 patients. There was transient nerve palsy in 4.7% and permanent was also in 4.7%².

In our study, we assessed the vocal cord status in the patients pre and post-operatively by indirect laryngoscopy as described by Tomoda C, et al.³

RLN was identified per-operatively and proper measures were taken to avoid any injury to the nerve. Damage to the recurrent laryngeal nerve (RLN) during thyroid surgery is the most common iatrogenic cause of vocal cord paralysis. Identification of the RLN and meticulous surgical technique can significantly decrease the incidence of this complication.¹ So, if we detect vocal cord palsy immediately after surgery, vocal cord palsy often recovers when visual preservation of RLN is successful.³

Post-operative recovery from anaesthesia was smooth in all the patients in my study. While according to the study conducted by Jamil M, RLN palsy may lead to respiratory obstruction post-operatively for which intubation followed by tracheostomy was required.⁶ RLN palsy should be detected before surgery for thyroid diseases with regard to the incidence of malignancy, histopathologic distribution, extrathyroidal invasion, management, and prognosis.⁹ Those patients having hoarseness of voice before surgery were excluded from our study. According to Jamski J study, permanent lesion of damaged RLN often manifests as an irreversible dysfunction of phonation. Frequency of this complication ranges from 0.5 to 5% in different thyroid surgery centers and increases in case of both recurrent goiter and complete thyroidectomy due to thyroid cancer.¹⁴ While no patient was found to have a permanent RLN palsy in our study.

In a study done by Miyauchi A in 2007, to avoid RLN palsy the technique of lateral mobilization of the nerve was adopted as in case of thyroid cancer, RLN may invade the trachea which fixes the thyroid to trachea.¹⁷ This technique of lateral mobilization of RLN was adopted in many of the case with thyroid cancer in our study.

In the study done by Shindo, the incidence of postoperative vocal cord paresis or paralysis in patients who underwent thyroidectomy with and without continuous RLN monitoring was compared. It was found that the difference was not statistically significant.¹⁸ In our study, we monitored the RLN continuously to avoid partial or complete injury. In his study, Li Lx, he found 5 cases who underwent thyroid surgery with non recurrent

laryngeal nerve(NRLN).2 patients were found to have vocal cord paralysis and 1 case recovered in 3 cases who had NRLN injury¹⁹. In our study, RLN was identified in all the patients and no patient was found to have NRLN.

CONCLUSION

With proper measures frequency of RLN damage during thyroidectomy can be reduced. Pre-operative indirect laryngoscopy should be done to assess the vocal cord status to see that the nerve involvement is already there or not. An expert Surgeon only should perform thyroid surgery to reduce the frequency of this complication and if some beginner, it should be under proper supervision. Before starting the surgery, anaesthetist should do an indirect laryngoscopy to assess the vocal cord status. Proper per-operative monitoring and identification of the nerve is mandatory. Immediately after removal of endotracheal tube (extubation), vocal cords should be assessed by indirect laryngoscopy. Patient should be monitored post-operatively for hoarseness of voice. With all these measures, frequency of RLN palsy can be decreased.

Recommendations: Damage to RLN can be avoided by proper intraoperative neuromonitoring. Electrode-embedded endotracheal tubes allow continuous intraoperative assessment of vocal cord function when connected to an electro-myographic (EMG) response monitor. Proper identification of the nerve and its course is important. Approaching the nerve along its distal portion is safe and effective. Thorough airway check pre-operatively is advisable in all patients. Visual nerve identification is the gold standard.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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