

Incidence Of Recurrent Laryngeal Nerve Palsy With And Without Nerve Identification During Thyroid Surgery

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Citation

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Abstract

Background: Recurrent laryngeal nerve paralysis is one of the most frequent and serious complications after thyroid operation. Routine dissection and demonstration of the recurrent nerve remain controversial. To know the risk of damage of the recurrent laryngeal nerve, a prospective study was done randomly in 50 patients. Material and method: Fifty consecutive patients underwent thyroidectomy. Only patients with normal vocal cords were included in the study. Patients were allocated to two groups randomly, in group (a) the nerve was not identified and in group (b) the nerve was identified. Results: There were 29 unilateral and 21 bilateral operations performed, with 71 nerves at risk. Out of these 50 operations, 4 patients in the group without nerve identification developed nerve palsy (16%) but the percentage of nerves injured was 2.84%. Conclusions: Careful dissection of the nerve during surgery essentially eliminates the risk of nerve injury during surgery.

INTRODUCTION

Recurrent laryngeal nerve paralysis is one of the most frequent and serious complications after thyroid operation. Routine dissection and demonstration of the recurrent nerve remain controversial. The most important aspect of an effective and safe surgical approach is a vast knowledge of surgical anatomy and pathophysiology in combination with meticulous handling and dissection of tissue. There is an inverse relationship between the number of thyroid surgeries performed and complication rate. This complication rate can be minimized in surgical novices by accurate anatomical knowledge and meticulous surgical technique. As with all surgical techniques, since Hippocrates, both sides of the coin are to be evaluated; here also an attempt is made to evaluate the complication rates and their consequences, if the recurrent laryngeal nerve is identified during surgery. Permanent nerve palsy is cited in the literature to occur in 0% to 2.1%, with an average of approximately 0.5% to 1%. Temporary palsy varies from 2.9% to over 10%. The right-sided nerve is at higher risk due to its wide anatomical variation as compared to the left one.

Aims and objective of study. 1) To assess the risk of damage of the recurrent laryngeal nerve during thyroidectomy. 2) To know the merits of one technique over the other and thus to reduce morbidity by coming up with a better technique with lesser morbidity.

METHOD

In a prospective study, 50 patients who underwent thyroid surgeries for various thyroid pathologies from January 2002 to October 2004 were analysed for RLN palsy at MP Shah Medical College, Jamnagar. Surgeries were performed by surgeons qualified in doing thyroid surgery. All patients were subjected to pre-operative indirect laryngoscopy (IDL) to assess the status of the vocal cords. Only patients with normal vocal cords were included in the study. Patients with evidence of pre-existing RLN palsy were rejected. The patients were allocated randomly in 2 groups (a) surgery performed without tracing the nerve (b) surgery performed with tracing the nerve. All patients were subjected to thyroidectomy under GA with endotracheal intubation. RLN was identified by standard surgical technique, traced and due care taken to avoid damage in group (b). Suspected nerve injuries were documented during the operations. Immediate post-operative direct laryngoscopy was performed by a surgeon with the help of an anesthesiologist for the assessment of vocal cords. Unilateral post-operative RLN palsy was defined as a paralyzed vocal cord with loss of movement from the midline. Patients with nerve palsy were followed by a general surgeon and ENT surgeon until full recovery. Follow-up IDL was done on the 5th post-operative day, and at the end of the 1st and 3rd month. The palsy was considered permanent if it persists for 6 months.

RESULTS

In the present series of 50cases, the following observations were made:

Figure 1

Table 1: Age distribution in various patients

Sr. No.	Age (Years)	No. of Patients	Percentage
1	10-20	06	12%
2	21-30	12	24%
3	31-40	17	34%
4	41-50	11	12%
5	51-60	03	06%
6	61-70	-	-
7	71-80	01	02%

Figure 2

Table 2: Sex distribution

Sr. No.	Sex	No. of Patients	Percentage
1	Male	05	10%
2	Female	45	90%

Figure 3

Table 3: Prevalence of various thyroid disorders

Sr. No.	Thyroid Disease	No. of Patients	Percentage
1	Thyroid cyst	03	06%
2	Thyroid adenoma	18	36%
3	Multinodular goiter	08	16%
4	Colloid goiter	05	10%
5	Primary toxic goiter	09	18%
6	Secondary toxic goiter	01	02%
7	Thyroid carcinoma	06	12%

Figure 4

Table 4: Incidence of various types of thyroid surgery performed

Sr. No.	Thyroid Disease	No. of Patients	Percentages
1	Hemithyroidectomy	29	58%
2	Subtotal thyroidectomy	18	36%
3	Near total thyroidectomy	03	06%

Figure 5

Table 5: Incidence of analysis of recurrent laryngeal nerve palsy (n=50)

Sr. No.	Procedure	No. of cases	No. of nerves at risk	No. of temporary nerve palsies		No. of permanent nerve palsies	
				(right)	(left)	(right)	(left)
1	Hemi-thyroidectomy	29	29	02	-	-	-
2	Subtotal thyroidectomy	18	36	02	-	-	-
3	Near total thyroidectomy	03	06	-	-	-	-

Figure 6

Table 6: Recurrent laryngeal nerve palsy when nerve was not identified (n=25)

Sr. No.	Procedure	No. of patients where palsy was temporary up to 3 month	Percentages
1	Hemithyroidectomy	02	6.2%
2	Subtotal thyroidectomy	02	5.5%
3	Near total thyroidectomy	-	-

Figure 7

Table 7: Incidence Of Recurrent Laryngeal Nerve Palsy

Sr.no	Laryngoscopy	Recurrent laryngeal nerve not identified (n=25)	Recurrent laryngeal nerve identified (n=25)
1	On table	03 (12%)	Nil
2	5 th day	04 (16%)	Nil
3	1 st month	04 (16%)	Nil
4	3 rd month	00 (0%)	Nil

Three patients were found to have recurrent laryngeal nerve palsy on table when the recurrent laryngeal nerve was not identified as compared to nil when the nerve was identified.

) There were 29 unilateral and 21 bilateral procedures with 71 nerves at risk. Four patients developed evidence of vocal cord paralysis without any recognizable nerve damage during surgery. Complete recovery was documented in all patients at the end of 3 months. The incidence of temporary palsy was 5.63 % (in 71 nerves at risk), the incidence of temporary nerve palsy was 6.2% for hemi-thyroidectomy and 5.5% for subtotal thyroidectomy. There was no evidence of palsy in the group with nerve identification and the incidence of palsy was not significantly different in the bilateral vs. the unilateral group. In malignancy, the incidence of palsy is higher as compared to benign cases (12.5%, a total of 8 nerves were at risk in malignant cases). In a literature survey, reports with identification of the recurrent nerve had significantly lower primary and permanent palsy rates when compared with reports without obligatory identification of the nerve (p < 0.01).

DISCUSSION

Recurrent laryngeal nerve (RLN) palsy remains one of the most devastating complications of thyroidectomy. Permanent nerve palsy is cited in the literature to occur in 0% to 2.1%, with an average of approximately 0.5% to 1%. Temporary palsy varies from 2.9% to over 10%. Temporary loss of function is defined as palsy recovered within 6 months and anything persisting beyond 6 month is considered as permanent palsy. Temporary cord paresis, which is often caused by edema or neuropraxia by excessive

nerve stretching seldom lasts more than 1 ½ months, permanent paresis is due to transection, ligation and/or traction of the nerve. Accidental injury to the RLN is not recognized in most of the cases. If the surgeon is aware of this complication primary repair of nerve can be tried. Preoperative and postoperative laryngoscopic examination should be done in every case. The role of routine exposure of the nerve is a subject of considerable debate. The first surgeon who has advocated routine exposure of the nerve was August Bier followed by Lahey of Boston in 1938³. Kasemsuwan et al. found that there was insufficient data to support that the routine identification of the RLN would be beneficial in preventing paralysis of the vocal cord⁴. Several studies demonstrate that identification of the nerve reduces the risk of permanent RLN palsy from 5% to less than 1%^{5,6}. Non-identification may lead to damage to the nerve without one's knowledge. It will be recognized only during extubation or later on when the patient is symptomatic. Once the surgeon identifies the nerve, he is sure that he has not damaged the nerve and even if accidental damage occurs, the injury can be recognized on table and repaired, or marker can be put for future repair. The right-sided nerve is more at risk because of more anatomical variations. The course of the right RLN is more oblique, in 0.5% of cases the right nerve is non-recurrent and on rare occasions a recurrent and a non-recurrent nerve may be present on the right side⁷. If the operating surgeon is not aware of this anatomical variation, he might damage the nerve accidentally. The RLN can be most consistently identified at the cricoid cartilage and is most vulnerable for injury in the vicinity of the ligaments of Berry. The course of the RLN is highly variable. On the right side, the nerve passes mainly between the branches of the IFA (50%) and posterior to the artery in 25% and on the left side, the nerve is posterior to the IFA in 50% and in the remaining patients it passes in between or anterior to the artery. In relation to the trachea, the right RLN is in the tracheo-esophageal groove in only 59% of cases and on the left side it is there in 70% cases. Berlin's study suggest that in 7-10% of cases the nerve passes through the substance of the gland for a short distance and on rare occasions the nerve may arise from the cervical vagus. In about 15%, the tubercle of Zuckerkandl, a small protuberance of thyroid tissue on the right, tends to obscure the recurrent laryngeal nerve at the level of Berry's

ligament⁸. In addition to all these variations, enlargement of the gland and deviation of the trachea will disturb the normal anatomy and will put the nerve at higher risk. In the present study, the incidence of nerve injury is 0% when the nerve was identified and 2.84% when the nerve was not identified, but the percentage of patients who suffered was 16% in the group without nerve identification. We should also keep in mind that if we try to perform surgery without knowing the anatomy and identifying the nerve the incidence of nerve injury may be few percent for us but is 100% for the particular patients.

CONCLUSION

Careful dissection of the nerve during surgery essentially eliminates the risk of nerve injury during surgery. Complete dissection of the nerve course is recommended as it is superior to limited exposure or no exposure. Post-operative vocal cord dysfunction is recovered in most of the cases without documented nerve damage. In the present study, the injury rate to the right RLN is higher as compared to the left one, probably because of anatomic variations. If the recurrent laryngeal nerve is not found in its normal course, the possibility of a non-recurrent nerve should always be kept in mind, especially on the right side. On the basis of our study, identification the recurrent laryngeal nerves should be mandatory at surgery to avoid RLN palsy.

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