

RECURRENT LARYNGEAL NERVE INJURY; A RISK IN THYROID SURGERY

Muhammad Asif Aziz, *Muhammad Ahmed, **Farhan Ahmed Majeed

Army Medical College, Rawalpindi, *Combined Military Hospital Lahore and **Quetta,

ABSTRACT

Objective: Aim of this study was to find out the frequency of recurrent laryngeal nerve injury in different types of thyroid surgery.

Study design: An experimental study.

Place and Duration: The study was carried out at Combined Military Hospital, Rawalpindi from January 2001 to July 2002.

Patients and Method: Seventy two patients were included in this study. Case selection was done by non probability convenient sampling from surgical out patient department. Age of patients ranged between 15 years to 73 years. Mean age was 36.5 years with maximum prevalence in the range of 31-40 years (31.5%) Male to female ratio was 1:1.7. All patients were evaluated clinically and were advised preoperative routine investigation. All patients had voice analysis along with indirect laryngoscopic examination preoperatively.

Results: The commonest presenting complaint in 72 patients was lump front of neck in 69 (95.8%) patients, 48(66.7%) patients were having nontoxic goiter, 15 (20.8%) patients were having toxic goiter and 9 (12.5%) patients were having malignant goiter. Out of all thyroidectomies performed 48 (66.7%) were sub total, 18 (25 %) lobectomy with Isthmusectomy, 5 (6.9 %) were near total and 1 (1.4 %) was total thyroidectomy. Temporary recurrent laryngeal nerve injury occurred in 2 (2.8%) cases. Permanent injuries to recurrent laryngeal nerve occurred in 2 (2.8 %) cases, one patient had vocal cord paralysis and other developed vocal cord paresis which improved partially with time.

Conclusion: Recurrent laryngeal nerve injury is a potentially dangerous and a serious complication of thyroid surgery. The overall percentage of injury to recurrent laryngeal nerve in thyroid surgery in this study was 4 (5.6%) cases.

Keywords: Thyroidectomy. Operative complications, recurrent laryngeal nerve

INTRODUCTION

Thyroid enlargements or dysfunction calls for surgical treatment. Surgery of thyroid gland carries with it extremely important risk to the recurrent laryngeal nerves which ascends in the groove between the trachea and esophagus where it is intimately related to the medial surface of thyroid gland and ultimately control the laryngeal muscles and vocal cords and hence speech. Iatrogenic injury of recurrent laryngeal nerve is one of the most serious concerns in thyroid surgery [1]. Paralysis of vocal cords is common sequelae of thyroidectomy [2]. It represents a serious complication inducing, serious functional sequelae such as phonatory, respiratory and psychological problems that limit working capacities and social

relationships of the patients. Postoperative hoarseness of voice is not always due to operative laryngeal nerve injury as 1-2% of patients have a paralyzed vocal cord before thyroid surgery [3] The percentage of recurrent laryngeal nerve damage varies from 0% to 13% with the higher range in bilateral exposures, such as in total thyroidectomy for carcinoma thyroid gland and in unilateral thyroid lobectomy combined with neck dissection [4]. Recurrent laryngeal nerve paralysis may be transient or permanent [5]. Transient paralysis occurs in 3 percent of the nerves at risk and recovers in 3 weeks to 3 months.

Complication rate in surgery for benign disease differs from that in surgery for malignant disease [6]. Surgery for malignant

neoplasm and recurrent substernal goiter is associated with an increased risk of permanent nerve palsy. Primary operations for benign goiter are associated with a 5.3% and 0.3% of transient and permanent nerve palsy, respectively [7]. Clinical examination, routine investigations supported by specialized investigation such as FNAC affect the overall management of the patient [8,9]. An experienced surgeon knows the location of recurrent laryngeal nerve and should be able to avoid such injury. As a matter of fact a total excision of gland even if very carefully done does not eliminate the risk of eventual anomalies of nerve course. Moreover in the presence of phlogosis caused by adhesions and the absence of direct eye control makes the traction maneuver on the thyroid potentially damaging [10,11]. In the hand of experienced surgeon complication due to lesion of the recurrent laryngeal nerves after thyroid surgery seems less significant [12]. A preliminary identification of the cervical juxtatracheal tract of the recurrent nerves and its preservation until they reach the larynx, allows ablation of the gland to be performed without risk. All this is possible only with an adequate knowledge of both the anatomy and the anomalies of the nerve's course. Recurrent nerve paralysis is a less frequent complication when the nerve is identified [13]. Thorough knowledge of cervical anatomy still remains the most important point in thyroid surgery [14]. Keeping all the above facts in consideration the need was felt that yet a study is required to support already existing fact in the medical world that recurrent laryngeal nerve damage related to thyroid surgery is a very important complication and needs to be correlated in the present day surgical practice.

PATIENTS AND METHODS

An experimental study was carried out in 72 patients who reported in surgical out

patients department and subsequently managed at Combined Military Hospital Rawalpindi, during January 2001 to July 2002. Combined Military Hospital Rawalpindi is a teaching hospital attached with the Armed Forces Post Graduate Medical Institute and Army Medical College Rawalpindi. This hospital receives large number of cases of goiter because of its location in the area in which goiter is endemic. Careful history taking and general physical, systemic and local examination was done for complete evaluation. Serum thyroid hormone, TSH level was done in all cases. FNAC was done in selected cases with suspicion of malignancy. Blood complete picture, urine routine examination, ECG and X-Ray chest and neck were done in every patient. Pre-operative indirect and direct laryngoscopy was done in all patients. Post operative direct laryngoscopy was done in all patients at the time of extubation. Post operative indirect laryngoscopy was done in selected patients who developed postoperative voice change, at repeated intervals for follow up purposes. Inclusion Criteria included all patients of both sexes with goiter in age group 15-73 yrs. Exclusion Criteria included patients with past history of any thyroid surgery or patients with preoperative vocal cord paresis/paralysis as examined on indirect laryngoscopy. The data was analyzed on SPSS (Statistical Package of Social Sciences). The results are given as mean and standard deviation for quantitative variables and frequency and percentages for qualitative variables.

RESULTS

Seventy two patients having goiter were surveyed for the study. The patient's age ranged from 15 years to 73 years. Mean age was 36.5 years with maximum percentage in the range of 31 years to 40 years (23 patients). The male to female sex ratio was 1:1.7. The

commonest presenting complaint was lump in the neck 69 (95.8%) cases. Forty eight (66.7%) patients were presented with non toxic goiter, 15 (20.8%) Pts with toxic goitre and 9 (12.5%) patients with malignant goiter 8 (11.1 %) patients with palpitation (Table-1). The commonest surgical procedure undertaken was subtotal thyroidectomy in 48 (66.7%) patients, lobectomy and Isthmusectomy performed in 18 (25%) patients, and in 5 (6.9%) patients near total thyroidectomy and total thyroidectomy in 1 patient (1.4 %) (Table-2).

In 42 (58.3%) patients recurrent laryngeal nerve was identified. It was found that on the right side, in 16 (38.1%) subjects the nerve is passing with in the branches of the inferior thyroid artery and on the left side in 9 (21.4%) subjects it was passing behind the trunk of the artery. In 4 cases RIN was identified on both sides (Table-3).

Table-1 Type of Goitre (n = 72)

Type of Goitre	Number	Percentage
Non Toxic Goitre(n =48)		
a. Diffuse Goitre	-	-
b. Solitary Nodule	14	19.4%
c. Multinodular Goitre	34	47.2 %
Toxic Goitre (n =15)		
a. Toxic Diffuse Goitre	3	4.1%
b. Toxic Solitary Nodule	1	1.4%
c. Toxic Multinodular Goitre	11	15.2%
d. Toxic Recurrent Goitre	-	-
Special Goitre (n=8)		
a. Auto Immune	-	-
b. Inflammatory	-	-
c. Malignant		
(1) Papillary Carcinoma	5	6.9%
(2) Follicular Carcinoma	3	4.1%
(3) Medullary Carcinoma	1	1.4%
(4) Ana plastic Carcinoma	-	-
(5) Lymphoma	-	-

Table-2: Type of Operation Performed on 72 Patients Subjected to Study

Operations	No of Patients	Percentage
Sub Total thyroidectomy	48	66.6%
Lobectomy and Isthmusectomy	18	25.0%
Near Total throidectomy	5	6.9 %
Total thyroidectomy	1	1.4 %

Table-3: Surgical Anatomy of the recurrent laryngeal nerves identified during surgery (total no of cases reviewed=42)

Course of the Nerve	No of Patients	Percentage
Right recurrent laryngeal nerve		
With in the branches of inferior thyroid artery	16	38.1%
Behind the inferior thyroid artery	6	14.3%
In front of the inferior thyroid artery	11	26.2%
Non recurrent	-	-
Absent	-	-
Left recurrent laryngeal nerve (n=13)		
Within the branches of inferior thyroid artery	3	7.1%
Behind the inferior thyroid artery	9	21.4%
In front of the inferior thyroid artery	1	2.4%

Out of 72 patients operated for goiter 4 (5.6%) patients had change in the voice. Two (2.8%) patients recovered in six weeks times and 2 (2.8%) patients had permanent recurrent laryngeal nerve injury. Both cases of permanent recurrent laryngeal nerve damage occurred, one in subtotal thyroidectomy for huge toxic goitre and second in total thyroidectomy for malignant goitre (Medullary Ca thyroid).

DISCUSSION

The recurrent laryngeal nerves are two most common structures out of numerous structures surrounding the thyroid gland, which should be safeguarded during thyroidectomy and in operations on neck to prevent its morbidity and mortality following such surgery [15] Injury to recurrent laryngeal nerve is one of the most frequent and serious complication of thyroid surgery and is well documented (in literature). Individual surgeon experience is significantly associated with complication rates [16] Underlying

disease is also related to percentage of right laryngeal nerve (RLN) injury and it should be isolated and preserved, even if infiltrated by differentiated thyroid cancer, is worthwhile to preserve for maintenance of postoperative vocal cord function without affecting the percentage of local recurrence or prognosis [17] Gross lesion involving anatomic division of right laryngeal nerve (RLN) produces permanent paralysis but minor trauma is usually well tolerated and paralysis is temporary [18]. Injury to the RLN is rarely life threatening, but vocal cord paralysis can be devastating to the patient [19]. The size of thyroid gland and weight of thyroid tissue removed have a definite influence on the rate of RLN palsy [20]. Not just the underlying disease but the surgeon and his surgical technique play an important role in the incidence of the injuries to the recurrent laryngeal nerve.

Exposure and identification of the nerve is an important step in thyroidectomy but for some its validity is controversial. There are reports that the rate of injury to recurrent laryngeal nerve is equivocal in either of the situations, however the reports in favour of exposing and identifying the nerve are much more prevalent.

The nerve can be confidently identified by its colour, fine longitudinal surface vessel (vasa Nervosum) and lack of pulsations. The most common mode of injury to recurrent laryngeal nerve is perhaps more frequently due to edema or stretching than to actual severance.

The results of this study were compared with international studies. A study on 521 patients done by Chiang et al showed temporary injury to RLN in 5.1% and permanent damage in 0.9% in benign goiter surgery. Recovery was noted in 3-120 days. Rate of injury of RLN in thyroid cancer was 2.0% [21]. Another study done by Rosatal et

al on 14,934 patients of (A multicentric study) showed transient palsy of RLN in 2.0% and permanent palsy of RLN in 1.0% cases of thyroid surgery [22]. A study done by Lo C Y et al showed transient RLN palsy in 5.3% and permanent RLN palsy in 0.3% [23]. Another study done by Friedrich T et al showed permanent nerve damage in 2 % of benign goiter and 10.1 % in thyroid carcinoma [24]. Our Result, are quite comparable with international studies. Transient RLN was noted in 4 patients (5.6%) 2 Patients (2.8%) recovered in 6 weeks times and 2 patients (2.8%) had permanent RLN damage. In these 2 patients, 1 patient was operated for huge toxic goiter and 2nd patient was operated for thyroid carcinoma.

CONCLUSION

Recurrent laryngeal nerve injury is a potentially dangerous and a series complication of thyroid surgery. The overall percentage of injury to recurrent laryngeal nerve in thyroid surgery in this study was 4 (5.6%) cases. But this is a small series with variable surgical procedure. Other scale, multicentre studies may be more helpful. Our goal in thyroid surgery should be to prevent recurrent laryngeal nerve injury. Proper exposure and identification of recurrent laryngeal nerve would decrease the chances of RLN damage.

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