



A Clinical Study to Assess the Risk of Recurrent Laryngeal Nerve Injury in Thyroid Surgery in A Tertiary Care Hospital

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Abstract

A post – operative bilateral permanent Recurrent Laryngeal Nerve (RLN) Palsy is a surgical tragedy. It is an iatrogenic horror comparable to a surgically induced facial nerve paralysis and possibly more incapacitating and embarrassing than the loss of a lower limb. Further more such a disaster is more than likely to be followed by the misery of litigation. Unfortunately thyroidectomy continues to produce a high rate of complications and damage to the recurrent laryngeal nerve is occasionally an inevitable complication of thyroid surgery. It may be temporary or permanent and/or unilateral or bilateral. Since the remarkable contributions to thyroidectomy made by Kocher, there have been modification by various surgeons, great surgical pioneers such as Wolf and Blight recognized the risk of injury to the RLN and even today the reported incidence ranges from 0.3- 13.2%. This study was conducted at sree mookambika college of medical sciences at department of general surgery from the year of oct 2023 to april 2025 . The results of the study are analysed with references to the number of RLNs encountered during operations, and not in relation to the number of operations performed. A total of 100 nerves were observed. Of these 53 nerves were exposed. A total of 100 nerves were observed. Of these 53 nerves were exposed and 47 nerves were not identified. Right recurrent laryngeal nerves numbered 57 and left 43. No single case of bilateral paralysis was encountered in this study. Out of the 100 nerves, 8 were found to be primarily injured in the immediate post operative period . Among the 8 nerves injured 4 cases recovered in the 1 year follow up; first 2 within 21 days after surgery and the remaining 2 cases recovered before the end of 1 year. In the remaining 4 cases damage (all unilateral) was permanent, putting the overall incidence of permanent recurrent laryngeal nerve injury to around 4%. Identification of the RLN during thyroid operations can reduce the vulnerability to damage. A total of 100 nerves were observed.

INTRODUCTION

A post-operative bilateral permanent Recurrent Laryngeal Nerve (RLN) Palsy is a surgical tragedy. It is an iatrogenic horror comparable to a surgically induced facial nerve paralysis and possibly more incapacitating and embarrassing than the loss of a lower limb. Further more such a disaster is more than likely to be followed by the misery of litigation. Unfortunately thyroidectomy continues to produce a high rate of complications and damage to the recurrent laryngeal nerve is occasionally an inevitable complication of thyroid surgery. It may be temporary or permanent and/or unilateral or bilateral.

Since the remarkable contributions to thyroidectomy made by Kocher, there have been modification by various surgeons, great surgical pioneers such as Wolf and Blight recognized the risk of injury to the RLN and even today the reported incidence ranges from 0.3- 13.2%. Opinion as to the advisability of deliberately exposing the nerve during thyroidectomy was sharply divided. Bier and his colleagues in their operations recommended dissection of the RLN at operation in 1914; and this practice was discussed, but considered to be inadvisable in "A system of operative surgery" edited by Burgher in the same year. In 1918 Judd, New and Mann shows that the RLN of dogs could be handled without fear of damage. Yet the routine exposure and visualization of the recurrent nerves at thyroidectomy was not undertaken on a large scale until 1935, when surgeons at Lahey clinic began the practice of demonstrating the nerves practically in thyroid operations and showed there by a marked reduction in their figures for nerve injury following thyroidectomy.

Crile (1929) had stated that, in many, the recurrent nerves were unlike other peripheral nerves in that they were naked and liable to damage by the slightest pressure or by the formation of scar tissue after exposure. This statement was vigorously denied by Berlin (1935) and by Lahey (1938), who claimed that the recurrent nerve was no different from other peripheral nerves, either in histological structure or in behaviour and could be handled with impunity^[1].

The sustained advocacy of the dissection of the nerves at thyroidectomy by Lahey has undoubtedly influenced surgical practice profoundly, but opinion was far from unanimous. Pirelli (1993) condemned nerve dissection out of hand and dogmatically asserted the "it is an axiom in thyroid surgery that a recurrent laryngeal nerve seen, is injured".

Hertzler^[2] (1938) stated that while he recognized that it was a sound surgical practice to safeguard important structures in or near the operative field by exposing them, he had given up the practice of dissecting the recurrent nerves because he considered

it harmful to remove the capsule of the nerve and expose its fibres to the exudates in the wound; he claimed that temporary disturbance of the cord function frequently followed dissection. These views were shared by many American surgeons (Smith 1964). In Britain, Joel (1932)^[5] with his unrivaled experience of thyroid surgery, considered it unnecessary provided that a wedge of the Posteromedial portion of the gland was left in situ. Pierce (1950) drawing from the experience of the New England Thyroid clinic, considered that isolation of the nerve in every partial thyroidectomy was a dangerous teaching, which could lead more to damage than to safety of the nerve. On the other hand Riddell, in a discussion at the Royal society of Medicine (1949) stated that he had adopted nerve dissection and strongly condemned what he termed 'blind' thyroidectomy. To hold the view that a recurrent nerve seen is a recurrent nerve injured is to adopt the naïve philosophy of the ostrich (Riddell 1970). Russell (1951) also recommended routine dissection and identification of the recurrent nerves as a standard technique of thyroidectomy^[3].

In 1977 Holt has examined the problem again and emphasized the importance of nerve identification. In 1983 Farrar WB et al and in 1985 Martensson et al favoured identification and preservation of the RLN. In 1991 Grotz et al^[4] showed the importance of the RLN identification in thyroid surgery. In this new era of thyroid surgery most authors agree with the principles proposed by Lahey in 1944 and favour routine systematic exposure of the nerves, that not only safeguard the nerves, but that the careful dissection entailed ensures that adequate thyroid tissue is excised, that homeostasis is more easily and certainly secured and that the parathyroid glands are less likely to be removed.

Aim and Objectives: The primary purpose of this study is to assess the risk of damage to the RLN during thyroidectomy. Secondly, it is hoped to obtain information as to whether or not impairment of nerve function follows adequate dissection of the nerve at operation.

MATERIALS AND METHODS

This study was conducted at Sree Mookambika college of medical sciences at department of general surgery from the year of Oct 2023 to April 2025. The results of the study are analysed with references to the number of RLNs encountered during operations, and not in relation to the number of operations performed. A total of 100 nerves were observed. Of these 53 nerves were exposed. Statistical analysis was done using the statistical package for social sciences (SPSS). Different statistical methods were used as

Table 1: RLN paralysis based on the number of nerves

	No. of nerves	Total No. of palsy	Tem. Paresis	Perm. Paralysis
Total	100	8(8%)	4(4%)	4(4%)
Dissected	53	4(7.54%)	3(5.66%)	1(1.88%)
Not dissected	47	4 (8.52%)	1(2.13%)	3(6.39%)

Table 2: RLN vulnerability based on the side

	No. of nerves	Initial total No. of palsy	Tem. Paresis	Perm. Paralysis
Right	57	5(8.75%)	2(3.50%)	3(5.25%)
Left	43	3 (6.97%)	2(4.65%)	1 (2.32%)

appropriate. Mean \pm SD was determined for quantitative data and frequency for categorical variables. The independent t- test was performed on all continuous variables. The normal distribution data was checked before any t-test. The Chi-Square test was used to analyze group difference for categorical variables. A p- value < 0.05 was considered significant.

RESULTS AND DISCUSSIONS

A total of 100 nerves were observed. Of these 53 nerves were exposed and 47 nerves were not identified. Right recurrent laryngeal nerves numbered 57 and left 43. No single case of bilateral paralysis was encountered in this study. Out of the 100 nerves, 8 were found to be primarily injured in the immediate post operative period . Among the 8 nerves injured 4 cases recovered in the 1 year follow up; first 2 within 21 days after surgery and the remaining 2 cases recovered before the end of 1 year. In the remaining 4 cases damage (all unilateral) was permanent, putting the overall incidence of permanent recurrent laryngeal nerve injury to around 4%.

There were two groups based on the exposure or nonexposure of the RLN during surgery. Of the 100 nerves 53 were identified during surgery and the remaining 47 were not dissected out. In 53 dissected nerves, a total initial injury was observed in 4 cases (7.54%), 3 (5.66%) being temporary and 1(1.88%) being permanent. Majority of the paralysis in the dissected group was temporary. In the nondissected 47 nerves the incidence was higher. Four nerves (8.52%) showed an initial injury. Majority of the injuries were permanent; that is 3 nerves (6.39%) showing no signs of recovery. In the remaining one (2.13%) the paralysis was temporary making good recovery in the stipulated period of follow up. A difference in the rate of injury could be noticed between right side and left side.

Table II provides a summary of the nerves on each side and the incidence of injury on either side. In none of the cases a bilateral paralysis was observed . On the right side permanent injury in 3 cases (5.25%) against one case (2.32%) on the left side.

This prospective study was undertaken to find out the magnitude of thyroidectomy related damage to the RLN and it proved significant .A total of 100 nerves were subjected to study with 53 nerves being exposed and the remaining 47 were not exposed during thyroidectomy.

This study concentrates mainly on the permanent damage suffered because both the patients and the surgeons are scared of the permanent palsy of the vocal cord. The results can be analysed in two ways. (a) number of paralysis may be expressed in relation to the number of patients operated (b) second method is correlating the number of paralysis to the total number of nerves at risk, which is opted by most of the authors. Hence to avoid disparity we preferred the latter method . All the results were analysed statistically to find out the significance (Z test). A comparison of our results with the prevalence is standard institutions at various parts of the world. The extremely low result observed by Riddell may be due to the technical expertise^[6-9].

This gives a vivid picture of the facts. The overall incidence of permanent RLN damage of 4% figured in this study is well comparable to those from various institutions, “ It is felt that a figure of about 5% for RLN injuries in general surgical practice is not excessive” (Wade 1955). Another important aspect of the study was whether unidentified recurrent nerve is in danger during thyroidectomy. Currently most authors have proved an improvement in the injury rate with RLN identification and hence many prefer this technique to a blind thyroidectomy^[10-13]. 1.88% Permanent paralysis (in this.36% permanent. In this study the rate of recurrent nerve injury fell from 6.39% to 1.88% making an obvious difference of 4.51% when RLN was identified. It is comparable to other authors .From the surgeon’s point, we consider this 4.51% as significant , though statistically this difference failed to show any significance .

Lahey and Hoover (1938)^[14,15] noticed a fall from 1.6% to 0.3% when RLN was identified. Similarly Cattell (1948) gave a figure of 3% falling to 0.7% (2.3% diff.). Also Riddell (1969) noted a fall from 2% to 0.6% (1.4% diff.) when RLN was identified. All of them consider this as clinically significant. Hence in spite of the statistically insignificance we strongly support the view that the unidentified RLN is in danger, however careful the surgeon.

CONCLUSION

Identification of the RLN during thyroid operations can reduce the vulnerability to damage. A total of 100 nerves were observed. Of these 53 nerves were exposed and 47 nerves were not identified. Right

recurrent laryngeal nerves numbered 57 and left 43. No single case of bilateral paralysis was encountered in this study. Out of the 100 nerves, 8 were found to be primarily injured in the immediate post operative period .

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