

**Research Article****Comparison of use of manual nerve monitor verses continuous nerve monitoring in total thyroidectomy in Pakistan**

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**ABSTRACT**

**Introduction:** The role of continuous neuro-monitoring (IONM) of the recurrent laryngeal nerve (RLN) during thyroid surgery is still debatable as most previous studies show no clear-cut evidence that IONM reduces incidences of injury to the recurrent laryngeal nerve.

**Objectives of the study:** This study aims at comparing the potential improvement of utilization of manual nerve monitor and continuous nerve monitoring in total thyroidectomy with regards to injury to the recurrent laryngeal nerve.

**Methodology:** This study was carried out during the period between January 2014 and January 2018 in THQ Hospital Yazman. A total of two hundred cases that underwent total thyroidectomy were evaluated for recurrent laryngeal nerve injury. The injury rate in these study cases were compared between cases of total thyroidectomy; done without continuous intraoperative nerve monitoring (group 1; n = 82) and those performed under visualization only (group 2; n = 118).

**Results:** The study results are in uniformity with previous studies, which have consistently shown no clear-cut evidence that IONM reduces incidences of injury to the recurrent laryngeal nerve.

**Conclusion:** Therefore, the utilization of IONM in thyroid surgeries has no contribution to an experienced surgeon in regards to reduction or avoidance of injury to the recurrent laryngeal nerve.

**Keywords:** Thyroidectomy, monitoring, nerves

**INTRODUCTION**

Laryngeal dysfunction after total thyroidectomy is a common complication, in which, recurrent laryngeal nerve injury is the leading cause of the problem.<sup>1</sup> Total thyroidectomy has been the primary method in the treatment of malignant lesions and certain benign conditions of the thyroid gland. In essence, the prevention of injury to the recurrent laryngeal nerve during thyroidectomy requires the identification of the nerve and the evaluation of its function. Recently, suggestions have been made that the use of continuous intraoperative nerve monitoring of RLN during thyroid gland operation improves the

safety of such activities. There has been, consequently, an augmented concern in the engagement of continuous intraoperative nerve monitoring since the method promises early identification of the recurrent laryngeal nerve stress. Most institutions are, thereby, currently performing monitored thyroidectomies.<sup>2</sup>

The trend in the use of continuous intraoperative nerve monitoring of the RLN during thyroid gland operation has continued to rise despite the lack of evidence of its improvement of thyroidectomy. Besides, many recent studies have shown that continuous intraoperative nerve monitoring has no

significant effect in reducing chances of injury to the recurrent laryngeal nerve.<sup>3</sup> As a result, in the identification of RLN, most medical institutions and surgeons use continuous intraoperative nerve monitoring as an adjunct to visualization.

### OBJECTIVES OF THE STUDY

This study purposes to evaluate the potential improvement of intraoperative neuro-monitoring of the recurrent laryngeal nerve as compared to visualization alone in reducing the incidences of RLN injury. The study will, therefore, underscore the possible role of this new technology regarding its efficacy and accuracy during and after thyroidectomy.

### MATERIALS AND METHODS

The present study was conducted as from January 2014 to January 2017 inTHQ Hospital Yazman and Hebei North University China.A total of two hundred cases that underwent total thyroidectomy were evaluated for recurrent laryngeal nerve injury. Cases of thyroidectomy were done without continuous intraoperative nerve monitoring, and the ones who underwent visualization alone were identified as group 1 (n = 82), whereas the patients that underwent total thyroidectomy through a continuous intraoperative nerve monitoring were classified as group 2 (n = 118).

The sample that was excluded from the analysis consisted of patients who underwent simultaneous central neck dissection and those who had a previous surgical intervention. A comparison was then made between the outcomes of the patients that underwent total thyroidectomy under a continuous intraoperative nerve monitoring and those that were subjected to visual identification alone. An experienced independent laryngologist

examined the vocal cords of all the patients using a laryngoscopy. The laryngeal examinations were carried out in two days before and after thyroidectomy. Consequently, permanency of vocal cord paralysis was determined by a laryngeal dysfunction that lasted more than six months after surgery. Six months follow up was subsequently carried out on all patients. The critical issues under observation were the injury to the recurrent laryngeal nerve and the roles of nerve monitoring device in the reduction of the injury after thyroidectomy vocal cord dysfunction.<sup>4</sup>

### STATISTICAL ANALYSIS

Fisher's exact test was used in making a comparison of the two-tailed P value of the two groups with a significance set at  $p < 0.05$ . Results were considered to be of statistical significance if the two-tailed p-value was less than 0.05.

### RESULTS

Table 1 below is a comparison of measured values of thyroidectomy with IONM versus those with visualization alone of RLN as obtained in the study. The comparison shows that there was no significant difference between surgeries that were performed with continuous intraoperative nerve monitoring (IONM) and those conducted under visualization alone. No drop-out or loss of follow-up was experienced in the duration of the study. In regards, in all the surgeries that were done with IONM (n=92), 26 percent suffered laryngeal nerves, as compared to 18.5 percent in those done with IONM. Within the whole population under study, no significant difference was observed ( $p = 0.2318$ ; Table. 1).

**Table 1:**RLN injury after surgery ( $p = 0.2318$ )

	With IONM	Without IONM	TOTAL
RLN injury after surgery	24	20	44
No RLN injury after surgery	68	88	156
Total patients (n)	92	108	200

## DISCUSSION

Recurrent laryngeal nerve monitoring in total thyroidectomy is a fairly new technology that is aimed at improving the surgery efficacy. The method is utilized to help surgeons to identify the RLN with precision in order to prevent or reduce injury to the recurrent laryngeal nerve.<sup>5</sup>

The following are the three main aims of IONM:

1. To enable surgeons to get an early laryngeal nerve location and thereby, avoid the damage to recurrent laryngeal nerves.
2. To act or adjunct as an approval to the visual recognition and, thus, prevent RLN misidentification.
3. To be a vital device in the confirmation of the neurophysiological reliability through its assessment of the laryngeal nerve function before, during and after surgery.<sup>8</sup>

However, the use of a variety of nerve monitoring techniques has frequently been debated because, despite its extensive use, there is no clear-cut evidence that it reduces incidences of injury to the recurrent laryngeal nerve.<sup>6,7</sup> Based on this study, the primary outcome measures show no statistically significant difference between thyroid surgeries carried with or without IONM. According to the results, each patient is at a similar risk of getting a laryngeal dysfunction, whether the thyroid surgery is done with or without IONM.<sup>9</sup>

Therefore, in regards to the purpose of this study, the analysis of the results indicates that there is no real observable benefit of thyroidectomy carried under IONM over those performed under visualization only. The total number of patients at risk was 200, with 92 nerves in the IONM classification and 108 classified in the Visualization Aloe group.<sup>10</sup>

## CONCLUSION

The study anticipated that thyroidectomy that was performed with the aid of recurrent laryngeal nerve monitoring would have a positive result on the prevention of laryngeal dysfunction and the laryngeal nerve identification in thyroid surgeries.

However, the results obtained from this study shows that there are no apparent benefits of IONM over manual nerve monitor in the reduction of the rate of recurrent laryngeal nerve injury. As such, the study results are in uniformity with previous studies, which have consistently shown no clear-cut evidence that IONM reduces incidences of injury to the recurrent laryngeal nerve (Galloway et al., 2010; Cernea& Dias, 2012). Therefore, the utilization of IONM in thyroid surgeries has no contribution to an experienced surgeon in regards to reduction or avoidance of injury to the recurrent laryngeal nerve.

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