thyroidectomy complications after ligasure small jaw use, case control, prospective study

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Research Article

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Abstract

Introduction: The ligasure small jaw (LISJ) has many advantages for thyroid surgery hemostasis. Other complications, however, remain at the same level or are even greater than with conventional treatment.

Material and methodology: Between March and December of 2022, I analyzed complications following total thyroidectomy (TTH). Patients were evaluated prospectively for case control study, including hypocalcemia (HC) and recurrent laryngeal nerve (RLND) palsy.

Results: all patients suffered from postoperative (HC) with Ca supplement with Vid D. one patient suffered with stridor after extubation.

Conclusion: To reduce the complication rate during thyroid surgery with a small jaw, more surgical expertise is required. In terms of (RLND) palsy and (HC), the current literature does not demonstrate a safety advantage of (LISJ) over conventional thyroid surgery that would justify a price increase.

Introduction

16.6% of patients had hypoparathyroidism after (TTH). It appears to be straightforwardly relative to the magnitude of operation, underscoring the need of locating and protecting the parathyroid glands throughout operation(1).

Soon following surgical removal of thyroid, subjective, nonspecific upper aerodigestive problems are prevalent. Injuries to the extrinsic perithyroidal neural plexus innervating the pharyngeal and laryngeal tissues could be responsible for these complaints(2).

The majority of otolaryngologists in the United States do not yet disclose routine use of (RLND) stimulation. Experience and practice of the operator affected intraoperative (RLND) monitoring far beyond operative workload(3).

Following complete thyroidectomy, (HC) is a significant problem. During (TTH), avoiding postoperative (HC) necessitates precise operative methods, diagnosis, and conservation of the parathyroid glands' vasculature. The frequency of temporary (HC) was 7%, but the rate of persistent (HC) was 0.11%(4). There was a 1.1% incidence of (RLND) damage. (RLND) injury was not substantially linked with sociodemographic characteristics, etiology (benign versus malignant), or the amount of thyroidectomy(5).

The influence of gender, maturity, and histopathology on RLN palsy and iatrogenic (HC) was non existent. The prevalence of RLN palsy and iatrogenic (HC) was considerably higher in patients with cancerous thyroid nodules. A comprehensive understanding of anatomy can lessen the occurrence of these issues(6).
Detection of the (RLND) using various procedures was comparable in thyroidectomies in which the RLN was identified at the area of the inferior thyroid artery or at the level of Berry's ligament. Nevertheless, transient (HC) was much more prevalent in the initial group of thyroidectomy patients with RLN identification(7).

In addition, the incidence of late problems grows older, despite the fact that a skilled surgeon can lower the probability of both initially and later consequences(8).

The unpredictability of surgical complications of thyroidectomies with blood clot poses a substantial hazard to patients and has major medical or legal consequences. Occurrences of post-surgical hemorrhage, unilateral vocal cord paralysis, lung infection, and surgical site infection(9).

The bipolar radiofrequency ablation equipment that is compatible with ordinary reusable bipolar cautery forceps is a simple, secure, and time-saving auxiliary for thyroid surgery that is just as successful as expensive devices such as the ultrasonic scalpel(10).

Furthermore, there was no important variation in operation period or surgical clinical outcomes between the bipolar energy sealing system and ultrasonic coagulation groups. The only important variation in expenses was between operators, regardless of the chosen equipment(11).

Safety of harmonic and ligature have been evaluated. (LISJ) showed twice complication rate of (RLND) palsy. But almost similar complications of (HC) in relation to harmonic scalpel(12). Although no clinical trials showed comparison to traditional technique of ties and micro clips for haemostasis with bipolar cautery.

**Methodology And Outcome**

During March 2022 and December 2022, I evaluated postoperative complications after (TTH). King Salman Hospital in Hail, Saudi Arabia, were evaluated prospectively, case control study. Including (HC), (RLND) injury. Ethical committee approval is IRB no : 417/2023

10 patients underwent surgery for (TTH) for a thyroid cancer using (LISJ) between November 2022 till December 2022. The follow-up all those patients showed features of biochemical (HC), which was managed by Ca supplement. One patient has stridor and low voice pitch after extubation.

All patients suffered from postoperative (HC) with Ca supplement with Vid D, 2 patients missed follow-up after surgery, 4 patients had 2 different times readings of low Ca level de. 2 patients have 4 reading of (HC). One patient had 11 reading and the next had 19 low Ca reading. All Patients had papillary thyroid cancer, without retrosternal extension, or lymph node involvements, Fig. 1.

**Discussion**
Female gender, neck dissection, parathyroidectomy, thyroid malignancy, multinodular goitres, and thyroiditis are identified risk factors for postoperatively (HC) (13).

The patient's surgical complications can be reduced with anatomical awareness, excellent surgical skills, and an efficient strategy for the handling of complications (14). If doctors are knowledgeable with the specifics of surgical approach and limit injury to neighbouring structures, surgery may be harmless (15).

81.4% of patients have four parathyroid glands, as indicated by the number of parathyroid glands. There are a total of 15.9% of misplaced parathyroid glands, with 11.6% in the neck and 4.9% in the mediastinum. 51.7% of misplaced parathyroid glands in the neck are localized in the retroesophageal/paraesophageal space or in the thyroid gland (16).

Left superior, 15.7%; left inferior, 31.3%; right superior, 15.8%; and right inferior, 37.2%. Considerably more inferior parathyroid glands were anomalous (68.5%) than their superior counterparts (31.5%). 43.4% of solitary anomalous parathyroid glands in male were located in the right inferior location. There was no difference of statistical significance in laterality (17).

After thyroidectomy, (HC) was widespread postoperative, although hypomagnesaemia was uncommon. After operation, hypomagnesaemia and a decrease in magnesium levels were related with (HC), but not clinical (HC). Measuring magnesium levels is important in cases of severe or prolonged (HC) (18).

For sutureless thyroidectomy, the (LISJ) approach with double or overlapped sealing is helpful. During ligature activation, however, surgeons must be mindful of tissue contraction that may decrease the space between the ligature and the (RLND) and raise the risk of damage (19). Experienced surgeons are crucial for reducing the rate of complications (20). Compared to conventional technique, variations in total and ionized calcium levels in patients with (LISJ) thyroidectomy are minimal. Using ligature small jaw looks to significantly reduce surgical duration, bleeding during surgery, and blood in the drain after surgery compared to the traditional technique (21, 22). In some reports (LISJ) is more advantageous than conventional approach (23).

When ligature were applied with tight proximity, (RLND) roots were subjected to higher degrees. Due to their effects on both EMG and temperature, the findings show that all these (LISJ) should not be put within 1 to 3 mm of the (RLND) (24).

Based on a functional assessment of electro myography in real time, the secure spacing for ligature small mandible stimulation was determined to be 2 mm. Much farther touch between the ligature small jaw and the (RLND) was harmless if the ligature small jaw was cooled for at least 2 seconds or by a contact muscle technique. Using the ligature small mandible with these time and location constraints in consideration will prevent (RLND) damage (25).

The right (RLND) branched off of the vagus nerve at or below the level of T1-T2. After winding around the subclavian artery, the right (RLND) becomes embedded in the tracheoesophageal fascia more than 0.5 cm below C7-T1. Before traveling between the trachea and the thyroid, the (RLND) travels superiorly,
slightly anterior to the tracheoesophageal groove. In 82 percent of right-sided dissections, the (RLND) entered the larynx at C6-C7 or below. After circling the aortic arch, the left (RLND) is embedded in the tracheoesophageal fascia below the T2 level. Before traveling between the trachea and thyroid, the nerve travels slightly anterior to the tracheoesophageal fissure and along the tracheoesophageal fascia. In all dissections of the left side, the (RLND) entered the larynx at or below C6-C7(26).

The frequency of the (RLND) interlacing with the inferior thyroid artery was 22.3% because of inherent variability. 4 (RLND) and inferior thyroid artery have a highly variable association. Individual variation is typically categorized into six groups(27).which still make the question of (LISJ) safety under concern, especially for junior surgeons.

Sixty-three percent of the (RLND)s were deep to the inferior thyroid artery, thirty percent were superficial to the artery, and seven percent were located between the arterial segments. A nerve branching was discovered in sixty percent of patients. In forty percent, no nerve branching was detected. Throughout surgeries, 1% of patients were proven to have non-(RLND)s(28).

**Conclusion**

Despite numerous reports suggesting the safety of the (LISJ) in thyroidectomy surgery, these studies did not demonstrate any superiority in reducing the incidence of complications such as (HC) or (RLND) palsy compared to the conventional technique. With additional technical precautions to reduce the complication rate.

**Declarations**

Ethics approval and consent to participate -Consent for publication : not applicable -Availability of data and materials : ready based on request

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all experimental protocols were approved by a named institutional and/or licensing committee. 417/2023
informed consent was obtained from all subjects and/or their legal guardian(s).

References


**Figures**

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**Figure 1**

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